



## **Clinical guidelines**

**for the physiotherapy**

**management of females**

**aged 16–65 years with**

**stress urinary incontinence**





*This is a re-print of guidelines that were endorsed by the Chartered Society of Physiotherapy and published in 2001. However, please note that in this edition Section 3.6.5 includes two additional contraindications for Neuromuscular Electrical Stimulation. This amendment has been made following comments from specialist clinicians, the guideline development group and subsequent discussions with researchers. Although there is an absence of published research evidence, there appears to be a consensus of expert opinion that these additional contraindications should be applied in practice.*

This document should be referenced as follows:

Laycock J, Standley A, Crothers E, Naylor D, Frank M, Garside S, Kiely E, Knight S, Pearson A. (2001) *Clinical Guidelines for the Physiotherapy Management of Females aged 16–65 with Stress Urinary Incontinence*. Chartered Society of Physiotherapy, London.

This clinical guideline was endorsed by the Chartered Society of Physiotherapy in January 2001. The endorsement process has included review by relevant external experts as well as peer review. The rigour of the appraisal process can assure users of the guideline that the recommendations for practice are based on a systematic process of identifying the best available evidence, at the time of endorsement.

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# Contents

Acknowledgements	4
Guideline development	
I    Background	5
II   Funding	5
III  Guideline topic	6
IV   Aim of the guideline	6
V    Objectives of the guideline	6
VI   Guideline development group	7
VII  Identification and interpretation of evidence	8
VIII Peer/external review and piloting	10
IX   Review of the guideline	10
X    Guideline dissemination and implementation	10
XI   References	11
<b>1    Guideline</b>	
1.1  Introduction and scope of the guideline	12
1.2  Prevalence of stress urinary incontinence in females	12
1.3  Effects of incontinence	13
1.4  Costs of incontinence	13
1.5  The continence mechanism	14
1.6  References	15
<b>2    Assessments</b>	
2.1  Introduction	16
2.2  Assessment of incontinence	16
2.2.1  Introduction	16
2.2.2  Evidence	16
2.2.3  Recommendations	17
2.2.4  References	17
2.3  Quality of life assessment	18
2.3.1  Introduction	18
2.3.2  Evidence	18
2.3.3  Recommendations	18
2.3.4  References	18
2.4  Patient education and management	19
2.4.1  Introduction	19
2.4.2  Evidence	19
2.4.3  Recommendations	19
2.4.4  Reference	19
2.5  Pelvic floor assessment and informed consent	19
2.5.1  Introduction	19
2.5.2  Evidence	20
2.5.3  Recommendations	21
2.5.4  Precautions	22
2.5.5  References	22

<b>3</b>	<b>Treatment options</b>	
3.1	Introduction	23
3.2	Adherence	23
3.2.1	Introduction	23
3.2.2	Evidence	23
3.2.3	Recommendations	24
3.2.4	References	24
3.3	Pelvic floor muscle exercises	24
3.3.1	Introduction	24
3.3.2	Evidence	25
3.3.3	Recommendations	28
3.3.4	References	28
3.4	Biofeedback	29
3.4.1	Introduction	29
3.4.2	Evidence	29
3.4.3	Recommendations	31
3.4.4	Precautions	31
3.4.5	References	31
3.5	Cone Therapy	31
3.5.1	Introduction	31
3.5.2	Evidence	32
3.5.3	Recommendations	32
3.5.4	Precautions	32
3.5.5	References	33
3.6	Neuromuscular electrical stimulation	33
3.6.1	Introduction	33
3.6.2	Evidence	34
3.6.3	Recommendations	38
3.6.4	Precautions	38
3.6.5	Contraindications	39
3.6.6	References	39
<b>4</b>	<b>Summary of recommendations</b>	
4.1	Assessments	41
4.2	Treatment options	42
	<b>References</b>	<b>44</b>

## **Appendices**

Appendix 1	Search strategies	50
Appendix 2	Guidelines for appraisal of research articles	52
Appendix 3	Guideline appraisal instrument for external reviewers	55
Appendix 4	External reviewers comments and suggestions	57
Appendix 5	Urinary continence assessment form	58
Appendix 6	Bladder record chart (frequency and volume)	62
Appendix 7	Vaginal/anal examination chart	64

## **Glossary**

66

## **List of Tables**

Table 1	Steering group members	5
Table 2	Members of the guideline development group	7
Table 3	Canadian Task Force Evidence Classification	9
Table 4	Percentage of the population of women living at home who have urinary incontinence	13
Table 5	Summary of evidence published since the systematic review by Berghmans et al (1998)	37

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# Guideline development

## I Background

Following a series of workshops 'Promoting Clinical Effectiveness', run by The Chartered Society of Physiotherapy (CSP) in 1996, physiotherapy managers in Yorkshire took the decision to support a pan-regional project to develop clinical guidelines. Six guideline topics were identified, based on perceptions of variations in practice and the commitment of clinicians to implement evidence-based practice. Nineteen of the twenty provider trust physiotherapy services and the three physiotherapy education divisions within the geographical area of Yorkshire volunteered their participation in the project. A steering group was formed (Table 1) to lead, develop and coordinate the whole process. Individual guideline development groups, supported by a group leader and a topic leader, were then formed to deal with each specific topic.

This guideline, for the physiotherapy management of females aged 16–65 years with stress urinary incontinence, is one of the six guideline topics. It is the first of these to be endorsed by the CSP.

**Table 1 Steering group members (for all six projects)**

- Jill Gregson, Physiotherapy Manager, Bradford Royal Infirmary
- Pam McClea, Superintendent Physiotherapist, Harrogate Health Care NHS Trust
- Sue Jessop, Physiotherapy Manager, Pinderfields General Hospital, Wakefield
- Jo Laycock, Independent Practitioner, The Culgaith Clinic, Penrith
- Pam Janssen, Division of Physiotherapy, University of Bradford
- Angela Clough, Division of Physiotherapy, Leeds Metropolitan University.

## II Funding

A fund was established to support the development of all six guidelines. Each individual development group sought to reimburse their expenses against this central fund. The fund comprised:

A contribution of £75 from each of the nineteen participating physiotherapy services	£1425
Yorkshire Physiotherapy Board	£300
Humberside Branch of the CSP	£100
Donated lecture fee	£100
TOTAL	£1925

However, the hidden costs were considerable, with virtually all the resources and expenses e.g. staff time, travel, clerical and stationary, being met by individual physiotherapy services and individuals.

For this incontinence guideline, a grant of £3,000 was paid by the CSP to the Robert Gordon University, Aberdeen, who undertook the refining and updating of the literature review in 2000. The Trusts employing the various members of the development group have continued to support their activities over an extended period of time. Individual members of the GDG continued to give their own personal time freely and financed their own travel over the last two years of the development process. No other external funding was received, therefore potential bias on recommendations for practice is deemed not to be an issue.

### III **Guideline topic**

This guideline on the management of stress urinary incontinence (SUI) arose from a need to address the problem of differing practice across the profession. Evidence shows that incontinence can have a devastating effect on the quality of life of sufferers and is an enormous cost to the nation (Royal College of Physicians, 1995). In 2000, the Department of Health published a document 'Good practice in continence services', which sets out a model of good practice to help providers achieve more responsive, equitable and effective continence services to benefit patients. It advocates integrated services and specifically mentions a role for the specialist physiotherapist. It states that therapies, including specific pelvic floor muscle exercises, biofeedback and electrotherapy, should be available to all patients. It was therefore felt necessary to address the quality of information available to physiotherapists to facilitate effective service provision, through the development of this clinical guideline.

### IV **Aim of the guideline**

The aim of this document is to promote evidence based practice by physiotherapists involved in the management of SUI in females between the ages of 16 and 65 years. Whilst acknowledging the important roles of other health professionals, the purpose of this document is to assist physiotherapists in pursuing the most effective choice of modalities and tools from those available to them, that lie within their scope of physiotherapy practice. In recognition of the value of patient involvement in guideline development, two patients were asked to review the document. They found the document useful in providing information about interventions available and options for treatment. However, the GDG recommends that in the future patients should play a central role in the guideline development process. Informed consent, patient involvement and shared decision-making based on high quality evidence are fundamental to physiotherapists' ability to assess and develop treatment plans which will ensure effective outcomes (Chartered Society of Physiotherapy, 2000).

### V **Objectives of the guideline**

The objectives of this document are:

- To provide an evidence based reference tool for all physiotherapists working in the field of SUI
- To enable services to provide the most effective and efficient methods of managing patients with SUI
- To provide reliable recommendations that facilitate a consistent approach by physiotherapists
- To act as guidance for commissioners when considering the physiotherapeutic element of new services or extending existing ones
- To provide a resource for patients to facilitate decision making about their care.

## VI Guideline development group (GDG)

The following criteria were used in determining the membership of the GDG. Members should:

- be chartered physiotherapists currently working in the promotion of continence and the management of incontinence
- have the support of their workplace managers/colleagues and be able to commit to regular attendance at group meetings
- have a high level of enthusiasm for the project
- have a willingness to learn and attend study days in support of the project.

The resulting group (Table 2) worked closely to review the literature and develop recommendations for practice in the light of the evidence or, in its absence, through consensus opinion.

**Table 2: Members of the guideline development group**

Madeline Frank MCSP	Clinical physiotherapy specialist in urodynamics/women's health, Airedale NHS Trust.
Shirley Garside MCSP	Senior physiotherapist in women's health, St James' University Hospitals NHS Trust, Leeds.
Elizabeth Kiely MCSP	Senior physiotherapist in women's health, Harrogate Health Care NHS Trust.
Stephanie Knight M Phil MCSP	Senior physiotherapist in the management of continence, Bradford Hospitals NHS Trust.
Jo Laycock OBE PhD FCSP	Group Topic Leader, Independent practitioner in the field of continence management, Cumbria.
Dianne Naylor MCSP	Senior physiotherapist in the management of continence, Bradford Hospitals NHS Trust.
Ann Pearson MCSP	Senior physiotherapist specialising in women's health, Leeds Teaching Hospitals NHS Trust.
Anne Standley MSc MCSP	Group Leader, Physiotherapy services manager, Dewsbury Health Care NHS Trust.

Added support for the revision of the guidelines was obtained from Elizabeth Crothers PhD, MCSP, Lecturer at the Robert Gordon University, Aberdeen.

The GDG, with the exception of Anne Standley, were members of the following special interest groups:

- Association of Chartered Physiotherapists in Women's Health
- Association for Continence Advice
- UK Chapter of the International Continence Society
- International Continence Society
- Chartered Physiotherapists Promoting Continence.

## VII Identification and interpretation of evidence

### **Search Strategy**

The aim of the search for evidence was to identify those papers in the published literature which provide evidence relevant to the topic of the guideline.

### **Key words**

Stress incontinence  
Anatomy  
Physiology  
Continence mechanisms  
Frequency/volume charts  
Urodynamics  
Pelvic floor  
Pelvic floor assessment  
Physiotherapy/physical therapy  
Pelvic floor muscle exercises  
Electrical stimulation  
Biofeedback  
Cones  
Prognosis  
Compliance/adherence  
Prevalence  
Quality of life measures

### **Literature searches were carried out using the following indices:**

Physiotherapy Index, 1986–2000  
Rehabilitation Index, 1987–2000  
Complementary Medicine Index, 1985–2000  
Occupational Therapy Index, 1986–2000  
MEDLINE (Index Medicus), 1985–2000  
CINAHL (Cumulative Index to Nursing and Allied Health), 1983–2000  
ASSIA (Applied Social Sciences Index and Abstracts), 1987–2000  
CSP Physiotherapy Research Projects Database, 1990–2000  
CSP Physiotherapy Documents Database, 1990–2000  
WCPT proceedings, 1995 and 1999  
The Cochrane Database of Systematic Reviews, 1990–2000  
The Database of Abstracts of Reviews of Effectiveness, 1990–2000  
EMBASE (Physical Medicine and Rehabilitation), 1990–2000  
AMED (Allied and Complementary Medicine), 1990–2000

A hand search included scrutiny of textbooks and journals not included in these databases.

The databases were searched systematically. Search strategies used are set out in Appendix 1.

The group did not believe the search should be restricted to certain study designs e.g. randomised controlled trials (RCTs), as the degree of evidence from controlled trials and studies is as yet limited in this area. However, in order that RCTs were not missed, the search strategy employed also covered specific searches for RCTs and systematic reviews. All searches were restricted to English language and human studies, which was a pragmatic decision. Grey literature was identified opportunistically.

### **Sifting the literature**

Initially, references were sifted from the searches by title, to determine relevance to the clinical areas of the guideline. If there was any doubt about an article's relevance, it was retained for reviewing. Relevant papers were assessed by at least two members of the development group against a set of methodological criteria (Appendix 2). This form served to ensure a rigorous quality assessment took place. A summary sheet for each paper was then completed, indicating the extent to which the criteria were fulfilled. All articles were critically appraised and summarised again by at least 2 other members of the development group and presented to the whole group for discussion.

Every member of the GDG undertook a programme of critical appraisal skills training, delivered by the University of Bradford, in preparation for their task of assessing and interpreting the literature.

In 2000, Elizabeth Crothers, Lecturer at the Robert Gordon University, Aberdeen, who has a specific remit in women's health research, updated the literature search and discussed her summaries with the other group members.

### **Formulation of statements and recommendations**

Evidence statements were then developed and graded according to the strength of the accumulated evidence (Table 3). From these statements and their supporting evidence the group made recommendations for clinical practice.

#### **Table 3: Canadian Task Force Evidence Classification (Canadian Task Force, 1979)**

- I Based on well-designed, randomised trials, meta analysis or systematic review
- II Based on well-designed cohort or case control studies
- III Based on uncontrolled studies or consensus opinion.

The GDG took the decision to assume that physiotherapy practitioners will use physiotherapeutic knowledge and clinical judgement in applying the principles and specific recommendations of this document to the management of individual patients in accordance with the Rules and Standards of the CSP (CSP, 1996; CSP, 2000).

## **VIII Peer/external review and piloting**

A draft version was sent for external review in March 1998. The reviewers (listed in the Acknowledgements) were asked for comments on aspects of the guideline's clarity, validity and comprehensiveness and were encouraged to provide an overall appraisal and to suggest amendments. To assist in their task each reviewer received a pro-forma adapted from the document "Clinical Guidelines Evaluation" (Sutton, 1996) for completion and return. This can be found in Appendix 3. Since this was carried out, the guideline has been further revised and updated in the light of comments from the CSP's Clinical Guidelines Endorsement Panel and an updating review of the literature.

The draft guideline was also made available on a widespread basis to colleagues and peers within the participating physiotherapy services at regular stages of development and comments sought and acted upon. It was well received by practising clinicians. All comments from all sources were considered and amendments made to the document where deemed appropriate by the development group. Examples of these can be found in Appendix 4.

## **IX Review of the guideline**

This guideline will need to be reviewed within three years of publication, when additional new evidence may contribute to changes in the recommendations for clinical practice. It is anticipated that support and guidance for the updating process will be provided at a national level. Due to probable future changes in personnel, it is not possible to guarantee that the future review group will consist of members from the present GDG. However, attempts will be made to secure some common participation, for consistency purposes.

## **X Guideline dissemination and implementation**

The process of implementation of a clinical guideline is equally as complicated as the development stage. In considering local implementation, the following points will need to be considered:

- An educational component to highlight the content of the guidelines to practitioners. Group members and local opinion leaders may be able to facilitate this stage, as will relevant clinical interest groups
- A pocket size summary for easy reference will be published by the CSP
- An audit tool will be developed by the GDG, supported by the CSP, to facilitate local implementation
- A record of requests for copies of the guidelines will be kept by the CSP to target sites for future audit.

## XII References

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# 1

## Guideline

### 1.1 Introduction and scope of the guideline

The International Continence Society (ICS) definition of urinary incontinence is “the involuntary loss of urine, which is objectively demonstrable, with such a degree of severity that it becomes a social or hygienic problem” (Abrams et al,1988). SUI is the most common form of urinary incontinence in women under 50 years of age. It is characterised by the loss of urine during physical exertion, e.g. coughing, sneezing, running and lifting. Genuine stress incontinence (GSI) is “involuntary loss of urine occurring when, in the absence of a simultaneous detrusor (bladder wall) contraction, the pressure inside the bladder exceeds the maximum urethral closure pressure; urodynamic assessment has to be carried out to make this diagnosis” (Abrams et al, 1988).

The GDG acknowledges that incontinence can be a problem for both men and women but because of limited resources and in order to keep the guideline development process within manageable limits, took the pragmatic decision to confine the scope of the guideline to women. The guideline is therefore restricted to the physiotherapy management of SUI in females aged 16–65 years. By selecting the age range 16–65 the group has excluded the multiple pathologies that frequently complicate the picture in people over 65, and eliminated a large group of young girls for whom it may be inappropriate to examine and treat vaginally. As the guideline is restricted to therapeutic interventions the use of insert devices, e.g. catheters and incontinence pads, is not covered.

All recommendations are made for physiotherapists with a sound knowledge and practical experience of general muscle re-education principles, and training in the treatment of incontinence. The GDG assumes that physiotherapists will use general medical knowledge and clinical judgement in applying the general practice, principles and specific recommendations of this document to the management of individual patients. Recommendations may not be appropriate for use in all circumstances. Decisions to adopt any particular recommendation must be made by the practitioner and the patient in the light of available resources and the circumstances presented by individual patients.

A section relating to assessment includes the overall assessment of continence, quality of life and the pelvic floor. Treatment modalities include pelvic floor muscle exercises, biofeedback, weighted vaginal cones and neuromuscular electrical stimulation.

### 1.2 Prevalence of stress urinary incontinence in females

Urinary incontinence in women is very common. Kuh et al (1999) reported that in a general population sample of 1,333 women aged 48 years, 50% reported symptoms of SUI in the previous year and, although it can occur at any age, there is increasing prevalence with advancing years (Ballanger and Rischmann, 1999). Stress incontinence and detrusor instability account for more than 90% of cases (Royal College of Physicians, 1995). GSI is the commonest cause of urinary incontinence in women (Shaw et al, 1992). Although incontinence often occurs following childbirth, it may affect nulliparous women when there is congenital weakness in the support to the urethra. Cutner and Cardozo (1990) reported that lower urinary tract symptoms are so common in early pregnancy that they are considered normal. Their progression throughout the ante-partum period and their resolution after childbirth has been documented by several authors



(Kelleher, 1997). However, the data are confusing and the underlying causes remain uncertain. Incontinence may also be due to pelvic surgery or post menopausal atrophy e.g. vaginitis or urethritis, and is exacerbated by conditions which increase abdominal pressure such as persistent cough or straining at stool; furthermore symptoms may be aggravated by pressure on the bladder from, for example, a pelvic mass or impacted rectum.

The definitions of incontinence include many different time-scales e.g. ever incontinent, incontinent in the last two months, incontinence twice in the last month; and quantity scales e.g. a few drops, requiring the use of pads, a change of clothing. Kuh et al (1999) defined incontinence into three categories.

- Severe – occurring at least twice a month and with a reported loss of more than a few drops
- Moderate - either but not both, of the above symptoms
- Mild – less than the symptoms defined as moderate.

Figures derived from reports from women living at home are shown in Table 4. It should be noted, however, that these reports depend primarily on the way incontinence has been defined in each case and also on the method of enquiry. The latter is particularly pertinent since many people are reluctant to admit to wetting themselves. Consequently, face to face enquiries may result in under reporting.

**Table 4: Percentage of the population of women living at home who have urinary incontinence.**

Age (years)	% Incontinent
15–44	5–7
45–64	8–15
65 and over	10–20

Based on an average of data gathered from papers by Thomas et al, 1980; Holst and Wilson, 1988; Jolleys, 1988; Elving et al, 1989; Brocklehurst, 1993; O'Brien et al, 1991. Source, Royal College of Physicians, 1995.

## 1.3 Effects of incontinence

Incontinence can have a devastating effect on the lives of sufferers and their families, and can be an enormous cost to the nation. In adult women with urinary incontinence, 60% avoid going away from home, 50% feel odd and different from others, 45% avoid public transport, and 50% report avoiding sexual activity through fear of incontinence (Norton et al, 1988).

## 1.4 Costs of incontinence

The financial cost of incontinence is unknown, and it is difficult formulating these costs, due to the many factors involved. However, Wagner and Hu (1998) have estimated the overall costs of incontinence to the United States economy at \$26 billion and the cost per person affected at \$3,565. The Continence Foundation, in their publication *Making a Case for Investment in an Integrated Continence Service* (April, 2000) estimated the overall cost to the NHS in England as a minimum of £353,595,000 per annum and the cost per 1000 population at £7,178. The conservative estimate of cost for the average Primary Care Trust (population 102,700) is £737,000 per year.

A briefing paper by The Royal College of Nursing in 1997 investigated the cost of incontinence depending on alternative referral pathways, and whether patients were living at home, in hospital, or residential care. The study found that home care costs 35p per day (£2.45 per week), acute hospitalisation £784 per week and residential care £300 per week.

Conservative therapy is usually the first approach for the majority of women, using a number of modalities, including pelvic floor muscle exercises, biofeedback, cones and electrical stimulation (Royal College of Physicians, 1995). These treatments are relatively inexpensive and readily available, have very few complications, do not compromise future surgery, and should be an option for all incontinent women (Royal College of Physicians, 1995).

Whilst it is widely accepted that the most effective treatment for severe or persistent GSI is surgery, Black and Downs (1996), in a robust systematic review of surgery for SUI found that on balance the evidence for its effectiveness is weak.

The clinical practice guideline on urinary incontinence in adults, published by the Agency for Health Care Policy and Research of the U.S. Department of Health and Human Services (1996), recommended that behavioural (conservative) and pharmacological therapies are reasonable first steps in the management of urinary incontinence. Their list of conservative therapies include pelvic floor muscle exercises, biofeedback, cones and electrical stimulation.

## 1.5 The continence mechanism

Urinary continence during raised intra-abdominal pressure is due to an integrated system of muscles, fascia and ligaments and neural control. In this respect the levator ani muscles play a significant role along with the shared fascial attachments of the anterior vaginal wall and the arcus tendinous fascia pelvis (ATFP) (DeLancey and Starr, 1990). This connection of the levator ani, pelvic fascia and the ATFP permits active contraction of the pelvic floor muscles to elevate and support the anterior vaginal wall. In addition, continence also requires a competent urethral sphincter (McGuire et al, 1976; Blavais and Olsson, 1988). There is evidence in healthy nulliparous women that a voluntary pelvic floor contraction always produces synergistic contraction of the external urethral sphincter (Bo and Stein, 1994) and so both components of the continence mechanism should respond to muscle training.

Subsequently a patient with SUI may have a defect in the fascial supportive tissues but intact urethral sphincter and pelvic floor musculature, or weak muscles but intact fascial supports or a combination of these. Furthermore, inadequate muscular activity may be due to muscle weakness as a result of disuse, which can be addressed with pelvic floor re-education. Conversely weakness, due to denervation or muscles torn from their attachment, is not likely to respond to muscle training.

Normally the pelvic floor muscles and urethral sphincter contract reflexly during a cough (Constantinou and Govan, 1982), as part of a pre-programmed sequence of events involving contraction of the intercostal, abdominal and diaphragmatic muscles. This orchestration of events involves accurate timing and strength of the pelvic muscle contraction, which may be compromised in nerve or muscle damage (DeLancey and Starr, 1990).

There are many ways to assess the pelvic floor muscles including ultrasound and MRI scanning. Physiotherapists, however, are generally reliant on digital palpation, and in some cases, the use of a perineometer incorporating pressure or electromyography (EMG).

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# 2

## Assessments

### 2.1 Introduction

In order to deliver effective care, information relating to patients and their presenting problem needs to be identified (CSP, 2000). The result of this assessment enables the physiotherapist to provide the patient with the best advice on effective treatment options. When applied before, during and at the end of treatment, it will provide information on the outcome of the intervention.

This section is divided into four. The first sub-section looks at criteria for a baseline assessment to determine the overall level of the problem. The second discusses the need for an assessment of quality of life, the third looks at patient education and management and the fourth at pelvic floor muscle assessment and informed consent.

### 2.2 Assessment of incontinence

#### 2.2.1 Introduction

The literature supports the need for a complete patient assessment to identify the type, nature and extent of the incontinence (Abrams et al, 1983; Resnick, 1990; Duffin, 1992; CSP, 2000.) Abrams, et al (1983) also advises recording assessments on a proforma. This section seeks out relevant criteria for inclusion in a baseline assessment of incontinence and advises on the need for a frequency and volume chart and urinalysis prior to treatment.

#### 2.2.2 Evidence

There are many factors that are considered essential for inclusion in an assessment proforma. Based upon an extensive systematic review by Berghmans et al (1998) the following have been identified and are included in the urinary continence assessment form, shown in Appendix 5, which has been developed by the GDG.

- Grade of severity
- Duration of complaint
- Pregnancy and/or menopausal status
- Previous surgery
- General condition of the patient.

Family history of incontinence is a useful marker in the assessment of SUI (Mushkat et al, 1996). The authors demonstrated a significant increase in the prevalence of SUI in first degree relations of those who themselves have SUI. Kuh et al (1999), in a National Medical Research Council Survey, found that girls who had reported daytime wetting or several nights per week bedwetting at the age of 6 years were more likely to be severely incontinent at age 43 years. Obesity, history of cystitis or kidney infections, and vaginal delivery over the age of 30 years, were also risk factors. These specific factors pertaining to incontinence have been included in an assessment proforma, currently widely used by practitioners (Appendix 5), although it is not a standardised assessment tool.

As part of the assessment procedure, the GDG recommends using a bladder diary, or frequency and volume chart (Abrams et al, 1983; Duffin, 1992; Siltberg et al, 1997). This should be completed before and after treatment, to provide base-line information and to monitor change. An example, developed by the GDG, is included in Appendix 6.

Moody (1990), Royal College of Physicians (1995) and the DoH (2000) all recommend a mid-stream specimen of urine (MSU) is analysed, or dipstick urinalysis undertaken, to eliminate a urinary tract infection (UTI) and other pathologies.

### **Evidence Statement**

Completion of an appropriate assessment proforma, a frequency/volume chart and urinalysis, prior to treatment, will assist in the planning of a patient specific treatment programme.

GRADE III

### **2.2.3 Recommendations**

- Initial assessment and continuous re-assessment are carried out.
- A proforma will facilitate the collection of relevant data.
- Evidence of a clinical examination and information gathered from the patient and other relevant sources, is recorded.
- A frequency/volume chart is completed before and after treatment.
- A urinalysis is carried out prior to treatment.

### **2.2.4 References**

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## 2.3 Quality of life assessment

### 2.3.1 Introduction

This section highlights the effect incontinence has on the lives of sufferers and their families. The World Health Organisation (WHO) defined health as 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity' (World Health Organization, 2001). Evaluation of SUI should include an evaluation of psychosocial effects. This section provides evidence to support the need for a quality of life assessment as part of the assessment procedure and examples of tools that can be used for this purpose.

### 2.3.2 Evidence

When evaluating quality of life it is helpful to use a standardised test. To perform an audit or evaluate services with regard to patient satisfaction or psychosocial impact there are some questionnaires that should be considered. A large number of generic standardised tests exist which examine the health-related quality of life of patients. However, the King's Health Questionnaire was developed specifically for incontinence (Kelleher et al, 1997). Wagner et al (1996) introduced an Incontinence Quality of Life (I-QOL) measure which was further developed by Patrick et al (1999) who found that older people tolerated more urine loss before affecting their quality of life.

Bo (1994), tested two tools for their reproducibility. The tools were the Leakage Index and the Social Activity Index. The test re-test correlation was highly significant with 95% confidence levels. There is however a note of caution as the results also showed that there may be a lack of sensitivity in the two tests at the upper ranges of the scores. Women who were more satisfied with their situation may score artificially high.

### Evidence Statement

It is important to take into account quality of life issues. Standardised tests are available to assist in this process.

GRADE III

### 2.3.3 Recommendation

- A quality of life assessment is undertaken to assist in the overall evaluation of the outcome of intervention.

### 2.3.4 References

Bo K. (1994) Reproducibility of instruments designed to measure subjective evaluation of female stress urinary incontinence. *Scandinavian Journal of Urology and Nephrology*. 28: 97–100.

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## 2.4 Patient education and management

### 2.4.1 Introduction

At this stage sufficient information should have been gathered for the physiotherapist to discuss with the patient, in appropriate language, the perceived problem, and to outline the possible treatment options and their appropriateness. A mutual agreement can then be made concerning the suitability of the treatment offered.

### 2.4.2 Evidence

Patient education is a key component of any successful treatment (Bo, 1994). Indeed Bo recommends spending one hour on a one to one basis with the patient, to assist their understanding of the anatomy and physiology of the lower urinary tract and pelvic floor muscles, prior to any pelvic floor muscle exercise programme. The GDG recommends that such information is presented to the patient prior to an objective evaluation as this will contribute to the giving of informed consent (section 2.5.2).

#### Evidence Statement

Education is a key component of any successful treatment.

GRADE III

### 2.4.3 Recommendations

- Patients are given information on the anatomy and physiology of the lower urinary tract and pelvic floor muscles.
- Information is given prior to any objective evaluation.
- Patient education is essential to assess the suitability for treatment.
- On-going education is essential for successful treatment.

### 2.4.4 Reference:

Bo K. (1994) *The intensive pelvic floor muscle exercise programme*. In (eds.) B Schussler, J Laycock, P Norton, S Stanton. *Pelvic Floor Re-education. Principles and Practice*. Springer-Verlag, London.

## 2.5 Pelvic floor assessment and informed consent

### 2.5.1 Introduction

As part of a full assessment, an objective examination of the patient's pelvic floor is required to complete the picture and enable the therapist to devise an appropriate treatment plan.

Informed consent prior to assessment and treatment must be obtained. To comply with the CSP's Rules of Professional Conduct and Standards of Physiotherapy Practice the physiotherapist must ensure the woman understands, and agrees to the examination, and is given the opportunity to decline, without it prejudicing her care. This may help to avoid misunderstanding, and potential retrospective complaints (CSP, 1996; CSP, 2000). Because of the intimate nature of some procedures this is particularly relevant in the assessment and treatment of SUI.

This section provides guidance on consent to assessment and treatment, digital assessment via the vagina, a validated method of recording the power, endurance, repetitions and number of fast contractions that a patient can perform before the muscles are fatigued and advice on precautions to intimate examination.

### 2.5.2 Evidence

A patient has a legal right to grant or withhold consent prior to examination or treatment. Should consent not be granted, the physiotherapist should not proceed (CSP, 2000b). To do so, the physiotherapist could be accused of assault. Patients should be given sufficient information, in a way they can understand, about the proposed examination and treatment and the possible alternatives (Royal College of Obstetricians and Gynaecologists, 1990; Association of Chartered Physiotherapists in Women's Health, 1994; CSP, 2000b). The Royal College of Obstetricians and Gynaecologists (RCOG) through the General Medical Council, provide the following guidance for intimate examinations:

- Explain to the patient that an intimate examination needs to be done and why
- Explain what the examination will involve
- Obtain the patient's permission
- Whenever possible, offer a chaperone or invite the patient to bring a relative or friend
- Give the patient privacy to undress and dress
- Keep discussion relevant and avoid unnecessary personal comments
- Encourage questions and discussion.

When treatment plans have been agreed and consent obtained this should be clearly documented (CSP, 2000b). Documentation must include information about the explanation given on the proposed treatment and record the fact that consent was given (CSP, 1996).

Additional guidance on chaperoning and related issues is available through CSP Factsheet No. 25 (CSP, 2000a). This document draws attention to the fact that certain assessment and treatment techniques are more likely to lead to allegations of misconduct than others. It specifically comments on the following: situations that involve a considerable level of undress, that necessitate patients adopting vulnerable positions; and where there is handling of a patient's body close to intimate areas. Further information is given on the need for particular care where the person being treated could themselves be regarded as being vulnerable. Departments are advised on the need to have policies and procedures in place to ensure the protection of both patients and staff.

#### Evidence Statement

Consent to examination and treatment is essential. Situations requiring chaperoning must be considered. GRADE III

Schussler (1994) stated that careful vaginal and/or rectal palpation of the levator ani is sufficient to determine a voluntary contraction, and to identify reflex contractions e.g. with a cough. Bump et al (1991) measured the urethral pressure profile of 47 women at rest and during a pelvic muscle contraction, after brief standardised verbal instruction. Only 49% had an ideal result, which was defined as a significant increase in the force of urethral closure without an appreciable valsalva effort. They concluded that simple verbal or written instructions did not represent adequate preparation for a patient who is about to start a pelvic floor muscle exercise programme. Bo et al (1988) reported that 9 out of 60 women strained instead of correctly contracting their pelvic floor muscles. These studies suggest that a more comprehensive method of teaching and assessing the correct pelvic floor muscle contraction is required.

A study by Theofrastous et al (1997), which examined the relationship between urethral closure pressure and vaginal pressure during a pelvic floor muscle contraction in minimally trained women, reported significant correlation between the two variables. The GDG considered this to be sufficient evidence to support the need for a vaginal examination to determine correct muscle action.



**Evidence Statement**

Digital assessment identifies whether or not a correct pelvic floor muscle contraction is performed.

GRADE II

Laycock (1994) described the strength of a pelvic floor contraction in terms of a modified Oxford scale 0 to 5, where 0 represents nil response; 1 represents a flicker; 2 represents a weak contraction; 3 represents a moderate contraction, with a degree of lift; 4 represents a good contraction, and the patient is able to contract the muscle against some resistance; 5 represents a normal muscle contraction, implying a strong squeeze and lift, against resistance. This technique was shown to be reliable in inter-rater and test-retest reliability studies. This assessment is the key to the selection of treatment modalities. Women graded 0, 1 or 2, i.e. those who cannot voluntarily contract their pelvic floor muscles or the contraction is very weak, are recommended to receive one or more of the following: electrical stimulation, biofeedback and/or cones. Women who demonstrate a grade 3, 4 or 5 are recommended pelvic floor muscle exercises, and any other appropriate modality available.

**Evidence Statement:**

Pelvic floor muscle contractions can be graded.

GRADE III

An exercise programme should be specific to patients' ability and goals, and guidelines given for rate of progression (DiNubile, 1991). There is no specific formula for the number of repetitions and sets that would provide optimal strength gains for everyone, and exercise programmes have to be individualised (DiNubile, 1991).

The PERFECT assessment scheme (Laycock and Jerwood, in press) is a method of recording the Power, Endurance, Repetitions and number of Fast contractions that a patient can perform, before the muscles are fatigued. Every contraction timed reminds the clinician to record the duration and number of contractions, so providing a patient specific exercise programme. This was tested by 17 volunteers and demonstrated good inter-rater reliability.

**Evidence Statement**

Careful pelvic floor assessment enables the planning of a patient specific exercise programme.

GRADE III

**2.5.3 Recommendations:**

- Policies are in place to guide staff on the requirements for informed consent.
- Prior to assessment and treatment, patients' informed consent is obtained and recorded in their notes.
- The patient is given the opportunity to bring or have a chaperone.
- Standards of physiotherapy practice relating to privacy and dignity are adhered to.
- A digital assessment via the vagina is undertaken to assess correct pelvic floor muscle contraction.
- The PERFECT assessment scheme is used to provide a baseline measure of function.
- Women graded 0, 1 or 2 receive one or more of the following treatments: electrical stimulation, biofeedback and/or cones.
- Women graded 3, 4 or 5 are offered pelvic floor muscle exercises.
- The results of the pelvic floor assessment are used to inform decisions about treatment.

#### 2.5.4 Precautions to examination

- Patients who are pregnant and have a history of miscarriages or who have been advised to avoid sexual intercourse whilst pregnant. In these circumstances, vaginal examination or the use of any vaginal device should be avoided.
- Inflammation and infection of the vulva and vagina
- Pelvic surgery in the previous three months
- Psycho-sexual problems.

#### 2.5.5 References

Association of Chartered Physiotherapists in Women's Health. (1994) *Standards of good practice in women's health: continence care*. ACPWH. 10–11.

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

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DiNubile NA. (1991) Strength training. *Clinical Sports Medicine*. 10 (1): 33–62.

Laycock J. (1994) *Clinical evaluation of the pelvic floor*. In: *Pelvic Floor Re-education: Principles and Practice*. eds. B Schussler, J Laycock, P Norton, S Stanton. Springer-Verlag, London. 42–49.

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Royal College of Obstetricians and Gynaecologists. (1990) *Intimate examinations. Report of a working party*. The Royal College of Obstetricians and Gynaecologists Press, London.

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Theofrastous JP, Wyman JF, Bump RC, McClish DK, Elser DM, Robinson D, Fantl JA. (1997) Relationship between urethral and vaginal pressure during pelvic muscle contraction. *Neurourology and Urodynamics*. 16: 6: 553–558.

# Treatment options

## 3.1 Introduction

The following treatment modalities are used by physiotherapists in the re-education of the pelvic floor as part of the management of SUI: pelvic floor muscle exercises, biofeedback, cone therapy and neuromuscular electrical stimulation (NMES). The effectiveness of these interventions is dependent on adherence to the therapy regimen. Accordingly, this section considers the available evidence for the effectiveness of the different modalities and discusses the part that adherence may play, and recommendations are made as a result. Guidelines on precautions and contraindications to treatment are provided for each modality.

## 3.2 Adherence

### 3.2.1 Introduction

When a patient complies with any treatment this is termed adherence. It is assumed that patients who adhere to their treatment will have better outcomes than those who do not. Indeed Chen et al (1999) showed that the only indicator of effectiveness of therapy regimens for SUI was adherence.

### 3.2.2 Evidence

Ramsay and Thow (1990) state that a "supported structure" is essential to enhance adherence in any pelvic floor exercise programme. Dougherty et al (1993) suggest that patients who have an audio tape to augment their exercise regimen show improved adherence and Bo (1995) found that patient motivation and adherence was generally enhanced by regular treatment sessions and contact with the therapist. Furthermore patients adhere better to all treatments if they are satisfied with the level of communication between the therapist and themselves. Ley and Llewellyn (1993) report that under the best circumstances patients will only remember two-thirds of the information they are given. This can be helped by:

- Presenting the most important facts first
- Stressing and repeating important facts
- Checking that the patient understands by asking her to repeat it in her own words
- Using written instructions and wherever possible have the patient write them down
- The use of reminders.

The authors further state that other key components of success include:

- Goal setting (tailored to the patient's situation and daily routine)
- Finding events in the patient's daily routine to which programme components might be linked.

Patients find it easier to adhere to regimens that include fewer lifestyle changes, and when positive feedback is provided specifically to their programme. Adherence should therefore be checked at every consultation (Hallberg, 1970).

McAuley et al (1994) assessed ways of enhancing exercise adherence in middle-aged men and women commencing a five month long walking programme. They concluded that a simple information based intervention programme can significantly improve adherence patterns.

### Evidence Statement

Adherence to a treatment programme improves outcome.

GRADE III

#### 3.2.3 Recommendations

- Written instructions for treatment are provided.
- Patients receive regular treatment sessions and contact with the therapist.
- Checks are made to ensure the patient understands the instructions.
- Individual goals for each patient, which minimise life style changes, are set.
- Positive feedback is given at every consultation.

#### 3.2.4 References

Bo K. (1995) Pelvic floor muscle exercise for the treatment of stress urinary incontinence: An exercise physiology perspective. *International Urogynaecology Journal*. 6: 282–291.

Chen HY, Chang WC, Lin WC, Yeh LS, Hsu TY, Tsai HD, Yang KY. (1999) Efficacy of pelvic floor rehabilitation for the treatment of genuine stress incontinence. *Journal of the Formosan Medical Association*. 98(4): 271–276.

Dougherty M, Bishop K, Mooney R, Gimmotty P, Williams B. (1993) Graded pelvic muscle exercise. Effect on stress urinary incontinence. *Journal of Reproductive Medicine*. 38: 684–691.

Hallberg C. (1970) Teaching patients self care. *Nursing Clinics of North America*. (5) 2: 223–231.

Ley P, Llewellyn S. (1993) *Improving patient understanding, recall, satisfaction and compliance*. In: Health Psychology. Process and Applications. eds A Broome, S Llewellyn. Chapman and Hall, Melbourne.

McAuley E, Courneya KS, Rudolph DL, Lox CL. (1994) Enhancing exercise adherence in middle aged males and females. *Preventative Medicine*. 23: 498–506.

Ramsay IN, Thow M. (1990) A randomised, double blind, placebo controlled trial of pelvic floor muscle exercises in the treatment of genuine stress incontinence. *Neurourology and Urodynamics*. 9: 398–399.

## 3.3 Pelvic floor muscle exercises

### 3.3.1 Introduction

In section 1.5 of this guideline the continence mechanism is discussed. The two main components that contribute to an intact mechanism are a competent external urethral sphincter and effective voluntary and reflex contraction of the pelvic floor musculature. The evidence suggests that in healthy women a voluntary pelvic floor muscle contraction always produces synergistic contraction of the external urethral sphincter. It is therefore theorised that muscle training will affect both components, providing weakness is not due to denervation or muscles torn from their attachment. Unfortunately, the majority of investigations in this area have not used randomised controlled trials. Furthermore, disparate exercise regimens have been used, and a variety of methods to measure pelvic floor strength and different outcome measures, making a meta-analysis of the results difficult. The following section discusses the evidence available and makes recommendations on methods for improving the strength, endurance and function of the pelvic floor.

### 3.3.2 Evidence

The theory behind the use of pelvic floor muscle exercises in the treatment of SUI is to improve strength, endurance and function of the continence mechanism. Pelvic floor muscle fibres are a mix of Type 1 and Type II fibres (Gilpin et al, 1989). Effective pelvic floor muscle contractions are thought to compress the urethra against the pubic bone, the direct mechanical cause of increased urethral pressure (DeLancey, 1996). Constantinou and Govan (1982) suggest that there is some evidence that during a cough, the pelvic floor muscle reflex contraction is part of a feed forward loop and may precede bladder pressure rise by 200–250ms. Jozwik and Jozwik (1998) examined the physiological basis behind pelvic floor muscle exercises and concluded that exercising for fibre type would also be of value and may enhance normal reflex integration of muscle fibre activity. The way in which the physiotherapist can influence these effects is by training the pelvic floor muscles (Bo, 1995).

Self-reported cure and success rates vary between 17% and 84% (Bo et al, 1990 and Kegel, 1951). Both studies used different outcome measures, and so these results may not represent a fair comparison. However, it is interesting to note that Kegel (1951) checked his patients weekly, and they were instructed to perform 300 contractions per day, or 20 minutes exercise, three times per day. The patients from the Bo et al (1990) study were instructed to perform 8 to 12 contractions, 3 times per day, and were seen only once a month, for muscle assessment. This would suggest that patients should be seen weekly, but account may need to be taken of their circumstances and the available resources.

Hahn et al (1993) reported 23% cured and 48% improved, in a controlled, but not randomised, clinical trial. Lagro-Jansenn et al (1991) compared three months daily pelvic floor muscle exercise with a control group receiving no treatment. They reported 60% of the patients in the treatment group to be dry or mildly incontinent, and only one in the control group. In a systematic review, Berghmans et al (1998) showed that pelvic floor muscle exercises were effective in the treatment of SUI.

#### Evidence Statement

Pelvic floor muscle exercises are effective in the treatment of stress urinary incontinence.  
GRADE I

Recommendations for the frequency of pelvic floor training vary from 10 contractions every waking hour (Benvenuti et al, 1987) to pelvic floor exercise for half an hour, three times per week (Dougherty et al, 1993). In both these studies, statistically significant strength gains were demonstrated, although in the Dougherty study the increase in strength was much less. Other studies proposed different training regimens, but the majority proposed daily exercise sessions. Bo et al (1990), in their intensive training regimen, recommended 8 to 12 contractions, three times per day, plus group therapy once a week, encouraging maximum contractions.

The long-term effect of pelvic floor exercises was evaluated by Cammu and Van Nylén (1995) by postal questionnaire, five years after the cessation of treatment. The overall cure/much improvement rate after treatment was 54% and five years later was 58%. This study showed that the improvement was maintained after five years and in fact some women improved after the end of treatment.

Muscle recovery is an important part of muscle growth and strength building, and most muscles need at least 48 hours rest after a hard work-out (DiNubile, 1991). This statement refers to "hard muscular work-outs", and DiNubile goes on to say "...when working at less than maximum muscle stimulation or overload, as in some rehabilitation situations, more frequent training sessions can be utilised and are often desirable." The DiNubile text relates to strength training in athletes, not to the rehabilitation of the pelvic floor in the general population. In addition, there is no clear evidence to support the frequency of exercise sessions related to the pelvic floor, but the experience of the GDG leads it to recommend that pelvic floor muscle exercises should be performed until the muscles fatigue, several times per day. Glycogen reserves can be exhausted by 10 or 12 near-maximal contractions, if each individual effort has been sustained to the point of fatigue (Shephard and Astrand, 1992).

If an untrained individual performs vigorous exercise, the engaged muscles may become painful, especially after eccentric exercise. The symptoms usually appear a few hours after the exercise, and may be most pronounced on the following day. This pain is probably, at least in part, caused by mechanical damage, and therefore inflammation of the myofibrillar structures and the connective tissues within the muscle. The repair of the damaged tissue results in a stronger muscle, much less susceptible to further injuries, even if the subsequent exercise is more severe (Astrand and Rodahl, 1988). Patients should be made aware of these effects in order to understand any such symptoms they may experience.

#### **Evidence Statement**

Pelvic floor muscle exercises should be performed every day.

GRADE III

The American College of Sports Medicine (ACSM, 1990) recommends 15 to 20 weeks are required for muscle training. Strength training effects that occur during the first 6 to 8 weeks are mostly caused by neural adaptation (Sale, 1988).

#### **Evidence Statement**

In sport settings, strength training effects may occur during the first 6-8 weeks; however, it may take a minimum of 15-20 weeks to produce muscle hypertrophy.

GRADE III

Miller et al (1996) reported on the beneficial use of "The Knack", in which patients were taught to practise anticipatory contraction of the levator ani during activities of stress, such as coughing. One week after instruction, urine loss was evaluated using The Knack, with a subjectively full bladder. Using this technique leakage was reduced by an average of 86% for a medium strength cough, and 60% for a deep cough. Visual feedback on cough expiratory pressure was provided by an oscilloscope to ensure consistent coughing efforts. Benvenuti et al (1987) also reported early response to treatment, with marked improvement after 15 days, and continued improvement with ongoing treatment. This suggests that patients may simply have to "find and use" their pelvic floor muscles to improve continence. It may also explain why Hahn et al (1991) did not find a significant increase in muscle strength, but noted 23% cured and 48% improved in their study.

#### **Evidence Statement**

Improvement in symptoms may be noted after one week.

GRADE II

In order to maintain the training effect over time, exercise must be continued on a regular basis (American College of Sports Medicine, 1990). An increase in the oxidative capacity of a muscle, induced by 2 months endurance training, is lost in 4 to 6 weeks if the training is stopped (Shephard and Astrand, 1992). Endurance seems to decline more rapidly than maximal power (Astrand and Rodahl, 1988). Reversal of beneficial training effects occur at approximately 5% to 10% per week, if training is stopped. However, moderate levels of muscular strength and endurance can be maintained with reduced training protocols (DiNubile, 1991). Bo (1995) states that three series of 8–12 close to maximal contractions, 3–4 times per week was enough to strengthen pelvic floor muscles.

#### **Evidence Statement**

Muscle strength will be lost unless exercises are continued on a regular basis. GRADE II

Using valid measuring devices several authors reported significant, but varying strength gains. Benvenuti et al (1987) measured urethral pressure gains from 56 to 74 cm H<sub>2</sub>O; Bo et al (1990) measured vaginal pressure gains from 7 to 22 cm H<sub>2</sub>O; Dougherty et al (1993) reported gains of 7 cm H<sub>2</sub>O. Hahn et al (1991) failed to demonstrate an increase in strength, measured on a vaginal pressure device. The discrepancy in strength gains may be due, in part, to the material and diameter of the vaginal sensor (Laycock and Sherlock, 1995). Furthermore, patients get used to using a perineometer, and improved technique may be responsible for apparent strength gains.

#### **Evidence Statement**

Pelvic floor exercise increases the strength of the pelvic floor muscles. GRADE II

In devising any exercise programme, specificity of training is important (Bo, 1995). It is important that any training programme includes exercises for both fast and slow twitch muscle fibres. There is a specific recruitment pattern of fast and slow muscle fibres and this needs to be trained for via functional activity (Bo, 1995). This has in part been explained by 'The Knack', the use of anticipatory pelvic floor muscle contraction immediately prior to an activity that causes urine leakage e.g. coughing (Miller et al, 1996), showing that counselling and understanding of function contribute to the development of continence. Pelvic floor exercises should be practiced in different settings and positions that relate to the patient's lifestyle. As the patient's muscle strength improves, the exercises should be reviewed and, when necessary, progressed.

#### **Evidence Statement**

Pelvic floor muscle exercises should involve fast and slow twitch fibres and be performed in a variety of positions. GRADE III

### 3.3.3 Recommendations:

- Pelvic floor muscle exercises are used to reduce the symptoms of SUI.
- Pelvic floor muscle awareness is taught.
- The pelvic floor is assessed and exercised in functional positions.
- The use of anticipatory pelvic floor muscle contraction immediately prior to an activity that causes urine leakage ('the Knack') is taught.
- A programme of pelvic floor muscle exercises is tailored to individual patients and includes exercises for both fast and slow twitch muscle fibres.
- Pelvic floor muscle exercises are performed until the muscle fatigues, several times a day.
- Pelvic floor muscle exercises are practised for 15–20 weeks.
- Patients are initially seen weekly, but account may need to be taken of their circumstances and/or the available resources.
- Pelvic floor muscle exercises are continued on a maintenance programme.

### 3.3.4 References

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## 3.4 Biofeedback

### 3.4.1 Introduction

Biofeedback can be defined as the registration of a physiological activity by audio or visual means. Many women not only have weak pelvic floor muscles but also limited awareness of their musculature and are therefore unable to produce a voluntary contraction. Biofeedback can be used both to re-educate and strengthen the pelvic floor muscles. It can take many different forms. Some forms of biofeedback are very simple to use, inexpensive and readily available to physiotherapists, for example digital palpation, and resistance to the withdrawal of vaginally located tampons or Foley catheters (Laycock, 1994). Schussler (1994) describe the Q-Tip test. The Periform™ and the Educator™ work on the same principle as the Q-Tip test. Manometry and electromyography provide more accurate feedback. However, care must be taken when using manometry to distinguish between inappropriate extraneous muscle activity and a pelvic floor contraction. Whilst most of the evidence available on biofeedback relates to manometry and electromyography, the GDG recommends the use of the other simple techniques mentioned above, should more expensive equipment not be available, or in addition to it.

### 3.4.2 Evidence

A meta-analysis of pelvic floor muscle exercise therapy with myofeedback by de Kruif and van Wegen (1996) found that very few studies have used a randomised controlled study design, which would have high statistical and internal validity. However, they reported that the results showed a trend towards pelvic floor muscle exercises with myofeedback as an effective treatment method for women with SUI and that it is more effective than pelvic floor muscle exercises alone. Ashworth and Hagan (1993) reported that the value of biofeedback was in augmenting pelvic muscle exercises and that the sensory feedback experienced could trigger new motor learning and increase compliance with pelvic floor exercise.

Hirsch et al (1999) evaluated the efficacy of pelvic floor training in the treatment of stress and mixed incontinence in women. The patients exercised for 10 minutes twice a day with a home EMG unit and a vaginal electrode for a period of 6 months; 50 patients started the study but only 33 completed. However, using an intention to treat analysis, it was reported that 56% (28/50) were cured or improved. Patients who could not perform a pelvic floor contraction were excluded from the study.

Berghmans et al (1998), in a systematic review, suggested that biofeedback might be useful in those patients who are unable to perform a voluntary contraction of their pelvic floor muscles. They also suggested that 'there is strong evidence that biofeedback as an adjunct to pelvic floor muscle exercises is no more effective than pelvic floor muscle exercises alone'. A meta-analysis by Weatherall (1999) of the same evidence used in the Berghmans et al (1998) systematic review, found a trend in favour of pelvic floor muscle exercise and biofeedback over pelvic floor muscle exercises alone.

#### **Evidence Statement**

Biofeedback can help to ameliorate the symptoms of SUI.

GRADE II

Due to the subjectivity and lack of sensitivity reported during digital palpation of the pelvic floor muscles a voluntary contraction assessed as grade 0 (nil) or grade 1 (flicker), of which the patient has no awareness, may register and be monitored, using EMG biofeedback equipment. Obviously, stronger muscle contractions (grades 2 to 5) will register increasing values. In support of this, Berghmans et al (1998) suggested that biofeedback might be more effective with patients who have insufficient or no awareness of how to contract the pelvic floor muscles correctly. Further work needs to be done with this group of patients if this is to be verified.

Woolner and Hirsch (1994) using EMG biofeedback, showed that patients with minimal pelvic floor muscle contractions i.e. increases of 1 or 2 microvolts, became aware of the muscle contraction required, improved muscle contractility, and reduced their symptoms of SUI.

There is very little mention of functional training in the biofeedback literature. As with all muscle re-education, specificity is an essential component. The GDG suggests that specificity is easier to address with biofeedback than without it. Another possible advantage of biofeedback is that it might lessen the time required to re-educate a muscle. This would have resource implications. Further research is needed to support these views.

#### **Evidence Statement**

Biofeedback is a useful tool for teaching a correct pelvic floor muscle contraction.

GRADE II

Evidence in the psychological literature encourages trainers to include a variety of exercises in an exercise programme (Shephard and Astrand, 1992). In addition, athletes are constantly striving to improve their performance. Pelvic floor muscle training should be no different. With biofeedback, patients can "see" their improvement and perform a variety of different exercises (e.g. concentric and eccentric and in different positions). The GDG believes that, in their experience, biofeedback enhances motivation of the patient both directly and also indirectly, by motivating the physiotherapist.

#### **Evidence Statement**

Biofeedback can increase motivation and adherence.

GRADE III

### 3.4.3 Recommendations

- Biofeedback can be used to teach correct pelvic floor muscle exercise.
- In the absence of manometry and electromyography, other forms of biofeedback should be used.
- Biofeedback can be used to increase motivation and adherence.

### 3.4.4 Precautions

Caution is needed in the presence of:

- Patients who are pregnant and have a history of miscarriages or who have been advised to avoid sexual intercourse whilst pregnant. In these circumstances, vaginal examination or the use of any vaginal device should be avoided
- Inflammation and/or infection of the vulva and vagina
- Pelvic surgery in the previous three months
- Psycho-sexual problems.

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## 3.5 Cone therapy

### 3.5.1 Introduction

Weighted vaginal cones have been developed as a means of exercising the pelvic floor muscles. A cone of suitable weight and size is introduced into the vagina above the pelvic floor. It is postulated that the feeling of losing the cone produces a contraction of the pelvic floor in an attempt to retain it. This section discusses the evidence for this theory and finds sufficient grounds for recommending the use of cones for the activation of the pelvic floor muscles and ultimately the reduction of SUI.

### 3.5.2 Evidence

Simultaneous EMG recordings of the pubococcygeus were performed before, during and after removal of the cone, on symptomatic and asymptomatic women (Deindl et al, 1995). The results showed that in women capable of retaining the cone, an increase in EMG activity was observed. Even in women not able to hold the cone, an increase in muscle activity was reported. The authors concluded that cone therapy activated the pelvic floor muscles reflexly. Furthermore, the study demonstrated improved co-ordination of pelvic floor muscle activity, in cases of unilateral absence of normal activity.

#### Evidence Statement

Cone therapy can activate the pelvic floor muscles in women with and without a palpable contraction. GRADE II

In 1995 Bo analysed six articles to examine the theory behind the use of vaginal cones in the treatment of SUI. She concluded that cones cannot be used as an objective measure of pelvic floor muscle strength and that subjective improvement rates varied from 30-63%. Since then two randomised controlled trials into the use of cones have been reported. Bo et al (1999) randomly placed 122 patients into four groups; control, pelvic floor muscle exercises, electrical stimulation and vaginal cones. The pelvic floor exercise group showed the greatest improvement but the women using cones also improved compared to the control group. Laycock et al (1999) randomly placed 101 women into three groups comparing vaginal cones with biofeedback and pelvic floor muscle exercises. In this study all patients improved and there was no significant difference in outcomes between any of the groups.

These studies demonstrate that cone therapy is effective when compared with no treatment and may be as effective as pelvic floor muscle exercises alone, although it is no more effective. Cones may help in motivating some patients as they can see a steady improvement in the weight held. However, they should only be used with care as some patients have complained of vaginitis and vaginal bleeding (Bo et al, 1999).

#### Evidence Statement

Cone therapy can reduce the symptoms of stress urinary incontinence. GRADE II

### 3.5.3 Recommendation

- Cone therapy can be used as a useful exercise and biofeedback device even for patients without a palpable voluntary contraction.

### 3.5.4 Precautions to the use of cone therapy

Caution is needed in the presence of:

- Patients who are pregnant and have a history of miscarriages or who have been advised to avoid sexual intercourse whilst pregnant. In these circumstances, the use of vaginal devices should be avoided
- Moderate and severe prolapse
- Inflammation and/or infection of the vulva and vagina
- Menstruation, and within two hours of intercourse, due to excess secretions
- Pelvic surgery in the previous three months
- Psycho-sexual problems.

### 3.5.5 References

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## 3.6 Neuromuscular electrical stimulation

### 3.6.1 Introduction

The treatment of stress incontinence by neuromuscular electrical stimulation is aimed at training the pelvic floor and external urethral sphincter muscles by producing a series of electrically induced contractions, to improve strength and function. Many current waveforms are available and stimulation may be described as acute maximal (high intensity treatments of short duration e.g. 20 minutes given several times per week) or chronic (low frequency, low intensity, daily treatment of several hours, over several months). Mantle and Versi (1991) in a postal survey, found that physiotherapists in the UK favoured interferential therapy, a form of acute maximal stimulation, and 144/192 respondents reported using this modality. However, a muscle physiologist, Dr Rosie Jones, has questioned the wisdom of using the high frequency carrier wave (2000–4000 Hz) of interferential therapy in the proximity of pelvic/abdominal organs, due to possible effects at cellular level (personal communication). Furthermore, the depth of penetration of high frequency carrier currents is not known. These effects are less well recognised or understood and more research evidence is required to support this concern.

The following are all acronyms for electrical stimulation used in the treatment of SUI.

NMES	-	Neuromuscular electrical stimulation
NMS	-	Neuromuscular stimulation
ES	-	Electrical stimulation
MES	-	Muscular electrical stimulation
FES	-	Functional electrical stimulation
TNS (TENS)	-	Transcutaneous electrical nerve stimulation
IT	-	Interferential therapy
TS	-	Trophic/eutrophic stimulation

Different countries and different clinicians appear to favour different terminologies for electrical stimulation. Therefore all health professionals should identify a stimulation current by the parameters described, of which frequency is probably the most significant. There is a move towards the use of battery-operated home stimulation units in the research literature, and any of the previously mentioned terms relating to electrical stimulation are available in this form.

The term "trophic" stimulation refers to the growth effects of the stimulation (Low and Reed, 2000). It is based on the precept that the motor nerve carries two types of stimulation; one that causes a contraction of the muscle and one that is nutritive to the motor unit due to antidromic flow via the axoplasm (Low and Reed, 2000). There is, however, considerable uncertainty over the stimulation parameters that are used and some clinicians wrongly refer to any treatment carried out with a home unit as "trophic (or "eutrophic") stimulation". Originally, Kidd and Oldham (1988) described an enhanced therapeutic effect of regular (daily) stimulation using the frequency of fatigued motor unit action potentials of the particular muscle under treatment. Farragher et al (1987) effectively treated non-recovering Bell's palsy using the mean motor unit firing frequency of the facial muscles. According to Low and Reed (2000) the motor nerve sends two types of encoded information to muscle fibres. One type produces immediate muscle contraction and the other is trophic, causing adaptation over a long period of time and is non-uniform, and patterned. For this effect, chronic low frequency currents are advocated.

### **3.6.2 Evidence**

Berghmans et al (1998), in a systematic review, concluded that the evidence for the use of electrical stimulation in isolation cannot show it to be any more effective in the relief of symptoms of stress incontinence than pelvic floor muscle exercises. There is, however, evidence to support the use of electrical stimulation as a pelvic floor re-education tool for patients who cannot perform a voluntary contraction (Bo, 1998). The GDG recommends that the stimulation should be active assisted, implying that the patient should "join in" with the electrically activated muscle contractions, rather than the stimulation being given in isolation. However, there is little evidence to support this. The Berghmans review should be viewed in light of this difference in application. There are many studies on the beneficial effect of electrical stimulation on other muscles of the body but with variable electrical parameters (frequency, pulse-width, duty-cycle) and so it is difficult to compare the results.

#### **Parameters**

The frequency of the pulses required to produce a tetanic contraction of mixed (fast-twitch and slow-twitch) skeletal muscles is between 35 and 50 Hz and less fatigue occurs with the lower frequency (Howe, 1996). In studies on cats, it was found that activation of the sphincter musculature was most effective at 50 Hz. However, care must be taken in the interpretation of animal studies (Ohlsson et al, 1986; Erlandson et al, 1977).

The pulse width and current amplitude determine the charge density, which will influence the response. Pulse widths less than 100 microseconds ( $\mu$ s) or 0.1 milliseconds (ms) are more suitable for sensory stimulation and the pulse width for activating muscles is generally between 0.1 and 0.3 ms, and current intensity up to 80 milliamps (mA). Work by Plevnik et al (1985), showed that the optimum pulse width for urethral closure was around 0.2 ms. Later studies (e.g. Bo and Maanum, 1996) demonstrated that electrical stimulation could significantly increase urethral closure pressure. The parameters used were a frequency of 50Hz, a pulse width of 0.75 ms and intensity range of 0-90mA.

To reduce fatigue, the duty cycle i.e. the "on - off" times, should be adjusted in such a way that the "off" time is at least double the "on" time, often commencing with the "off" time 4 or 5 times the "on" time, for weak muscles (Benton et al, 1981; Packman-Braun, 1988).

Almost all the clinical trials quoted in this document have used different electrical parameters i.e. different frequencies, pulse widths, duty cycles, treatment times and number of treatments. However, in view of the widely acknowledged work of Ohlsson et al (1986) and more recent

studies (see Table 5), the GDG recommends regular stimulation, using a fixed frequency current of around 35 Hz, rectangular pulses with pulse width of 0.25 ms, and a non-fatiguing duty-cycle. Treatment times should start at 5 minutes once or twice each day, and progress as muscle strength increases and fatigue decreases, and the vaginal tissues become accustomed to the stimulation.

The majority of recent clinical trials (Table 5) describe one or two daily sessions of electrical stimulation with a home unit, and no other treatment. Clinical experience and research evidence (Davila and Bernier, 1995), suggests that combination therapy i.e. electrical stimulation, pelvic floor muscle exercises and biofeedback, should be used if available and appropriate.

#### **Evidence Statement**

Selection of safe and suitable electrical parameters will ensure safe and effective muscle training.

GRADE II

Laughman et al (1983) described a study to compare strength changes in quadriceps femoris muscle as a result of electrical stimulation and isometric exercises. 58 subjects were randomly divided into three groups:- Group 1 – control group (n=19); Group 2 – daily stimulation of the right quadriceps femoris (n=20) using a 50 Hz Russian stimulation current, delivering 15 seconds of surged current (which gave an effective 10 second contraction), followed by 50 second rest period, 10 contractions per day, five days per week, for five weeks.; Group 3 – isometric exercises (n=19); these subjects performed a 10-second maximum contraction followed by 50 second rest period, 10 times per day, 5 days per week, for 5 weeks. The authors reported that the electrically stimulated and isometrically exercised muscles had statistically significant increases in muscle torque when compared with the non-exercised control group. On average, the electrically stimulated group's strength increased 22%, and the isometric-exercise group increased by 18%. The quadriceps study has been included in this guideline as the quadriceps and the pelvic floor muscles have a similar mix of Type I and Type II muscle fibres. Moreover, both muscles show great variability between subjects (Johnson et al, 1973; Gilpin et al, 1989).

Further support for strength gains with electrical stimulation is quoted by Benton et al (1981) and Low and Reed (2000), who describe the preferential recruitment of the Fast Twitch (Type II) muscle fibres, which are responsible for strength and speed. Benton et al (1981), also report that, not uncommonly, one or two short "facilitation" sessions using electrical stimulation with a patient who initially demonstrates a poor or absent voluntary contraction, may assist in the production of a voluntary response of functional force.

#### **Evidence Statement**

Electrical stimulation can be used to facilitate and strengthen pelvic floor muscles.

GRADE II

The efficacy of relevant electrical impulses for depolarisation of nerves to activate skeletal muscle depends on suitable electrodes and their placement. This implies minimum impedance at the electrode/tissue interface, and close proximity to the nerves (or branches of the nerves) supplying the muscles (Low and Reed, 2000; Benton et al, 1981). The vaginal route satisfies these requirements for the stimulation of the pelvic floor musculature. All the clinical trials of electrical stimulation for the treatment of SUI quoted herein have used vaginal electrodes. However, a pilot study reported by Bo and Maanum (1996) on the effects of vaginal stimulation, showed that positioning of the vaginal electrode was difficult because of various individual anatomical variations and the perineal muscles being invisible to the operator. Furthermore, Erlandson et al (1977) showed that changing the electrode position by as little as 10 mm could have a different effect.

The Periform™ vaginal electrode has been designed to ensure low impedance between the electrode and the vaginal walls and little, if any, movement during a contraction. The Periform™ allows both the patient and the therapist to observe the contraction produced by electrically stimulating the pelvic floor muscles (Laycock, 1997). Attached to the electrode is an indicator that moves downwards/posteriorly during a contraction of the pelvic floor muscles, making it possible to verify the effect of the stimulation.

#### **Evidence Statement**

Acute maximal neuromuscular electrical stimulation via the vaginal route can produce a pelvic floor contraction. GRADE II

None of the clinical trials on electrical stimulation of innervated striated muscle reported herein describe instructing the patients to "join in" with the stimulating current. However, muscle re-education requires conscious effort and the neural pathway starts at the cortex, and so neuromuscular electrical stimulation should always incorporate active-assisted contractions to utilise the complete neural pathway. Benton et al (1981) describe "facilitation", in which a patient's voluntary response is supplemented with various motor and sensory stimuli. Low and Reed (2000) recommend electrical stimulation to facilitate voluntary contraction of muscle that is not readily under control, such as the pelvic floor.

#### **Evidence Statement**

A patient's ability to contract the pelvic floor muscles will be improved by supplementing the use of electrical stimulation with their own efforts and vice versa. GRADE III

There is conflicting and poor evidence surrounding electrical stimulation training protocols for pelvic floor dysfunction and stimulation tends to be used more often as a re-educational tool (Bo, 1998). This concurs with an observation by Yasuda and Yamanishi (1999) that if patients can contract their pelvic floor sufficiently then voluntary contraction is more effective than electrical stimulation. In a study by Bo et al (1990), 30% of women with pelvic floor dysfunction demonstrated an inability to contract their pelvic floor muscles on first attempt. Therefore, electrical stimulation is recommended in such patients who are initially unable to identify the pelvic floor muscles, or those whose muscles are very weak (Greisson and Fall, 1997; Berghmans et al 1998; Bo 1998).

There has been a trend in recent years away from long-term (chronic) stimulation to short-term (maximum, acute) stimulation but no consistency in treatment protocols has been established. Yamanishi and Yasuda (1998) in their review of the literature on electrical stimulation for stress incontinence, concluded that short-term stimulation is more recommendable than chronic (long-term) because the incidence of adverse events (vaginal irritation, pain) is much less and clinical outcomes are comparable.

At one-year follow-up of a multi-centre prospective non-randomised clinical trial (n=31), Richardson et al (1996), showed no significant difference in treatment outcomes between patients receiving 15 minutes stimulation twice per day and those receiving 15 minutes every other day. Adherence and satisfaction were higher for the every other day group than for the every day group. The strength of the evidence is decreased slightly because the group allocation was consecutive rather than random and statistical power of the analysis was poor. Yamanishi and Yasuda (1998) in their review of the literature on electrical stimulation for SUI, showed that the long-term effects of acute maximal electrical stimulation were good and that only a minority relapsed, and for those, repeated or periodic episodes of treatment were recommended. Again, the studies reviewed described electrical stimulation in isolation.



**Table 5: Summary of evidence published since the systematic review by Berghmans et al (1998)**

Author	Design/method	Results	Conclusion
Bo, et al (1998)	Single blind randomised controlled trial. n=107 Group 1: Pelvic floor muscle exercises n=25 Group 2: Electrical stimulation n=25 Group 3: Vaginal cones n=27 Group 4: Untreated n=30	Muscle strength was significantly greater after pelvic floor muscle exercises than after either electrical stimulation or cones (p=0.03). Adherence was significantly greater in the pelvic floor muscle exercise group when compared to the cones and the electrical stimulation groups.	Pelvic floor muscle exercises are superior to electrical stimulation and cones for the treatment of genuine stress incontinence.
Chen, et al (1999)	Before and after study n=87. Women received electrical stimulation: 25Hz for 20–60 minutes per day for 3 months. They were also given pelvic floor muscle exercises; these were 15-minute sessions performed twice daily. Re-assessment took place at 3, 6, 12, 18 and 24 months.	On 2 year follow up it was shown that 61% showed significant improvement and for 39% the treatment had been a failure. The only significant predictor of success was adherence.	Stimulation and pelvic floor exercises were shown to be effective at 2-year follow-up for 61% of patients.
Knight, et al (1998)	Prospective randomised controlled clinical trial. n=70. Group 1: Control group received six-month programme of pelvic floor muscle exercises and biofeedback. Group 2: In addition to the above, received chronic home stimulation (low frequency low intensity for several hours per day) Group 3: In addition to Gp.1 treatment received 16 sessions of acute maximal stimulation in the clinic.	There was no statistical difference between the groups; however the group that received acute maximal stimulation had a higher number of patients improved or cured.	Chronic stimulation carried out at home may have influenced the fibre type ratio in the direction of slow twitch, Type I fibres. The authors concluded that acute maximum stimulation at the clinic was more effective and that it might be even better for those who had had incontinence problems for some time. No additional effect was gained from the use of stimulation when pelvic floor muscle exercises and biofeedback are given.
Kralj (1999)	Before and after study n=111 with moderate stress incontinence. Frequency 20Hz for 1.5–2 hours everyday for three months	50.5% cured, 23.4% improved and 26.1% did not improve.	Stimulation appeared to be effective in the treatment of moderate stress incontinence. The efficacy of the treatment would depend on the patient selection and the parameters of electrical stimulation used.
Yamanishi, et al (1997)	Placebo controlled double blind study. n=44. Group 1: active stimulation 50Hz maximal intensity, for 15 minutes 2–3 times daily. Group 2: sham stimulation	A significant difference was noted between before and after treatment values p=0.023. After therapy the number of leaks was significantly different in the active group compared with the sham group (p=0.0004). There was an inter-group difference with regard to frequency of incontinence (p= 0.04) and number of pad changes (p=0.0007). The effect on daily activities was significantly decreased in the active stimulation group (p=0.001).	In this study there were significantly more patients cured or improved on frequency of leakage and pad test using the active device, compared to the sham device. The cure rate for electrical stimulation was found to be 45% and was considered to be safe and useful.

In a systematic review (Bo, 1998) identified the following incidences and range of side effects as follows:

- Sand et al (1995); 14/28 in the stimulation group and 7/16 in the control group reported a range of effects. These included vaginal irritation and infection, pain, and urinary tract infection
- Luber and Wolde-Tsadik (1997); reported side effects in 3/20 of the stimulation group and 2/24 in the control group
- Smith (1996); reported side effects in 18.5% (n=27) of patients undergoing neuromuscular electrical stimulation
- Plevnik et al (1986); 12/310 reported side effects.

As the majority of studies reporting side effects appear to occur in both the active and the placebo treatment groups it is possible that the adverse effect may be due, in part, to the presence of the internal electrode and not to the stimulating current.

#### **Evidence Statement**

Patients with pelvic floor muscle contractions registering a grade 0 or I on the modified Oxford scale are unlikely to be able to undertake a course of pelvic floor muscle exercises; they may therefore benefit from a course of neuromuscular electrical stimulation. GRADE III

#### **3.6.3 Recommendations:**

- The selection of safe and suitable electrical parameters is important. The GDG recommends the following, although different parameters have also produced effective pelvic floor muscle training:  
Frequency: 35Hz  
Pulse width: 250µs (0.25ms)  
Current type: bi-phasic rectangular  
Intensity: maximum tolerated  
Duty-cycle: 5s on/10s off. Very weak muscles: 5s on/15s off  
Treatment daily/twice daily (home treatment)  
Treatment time: 5 minutes initially, gradually increasing to 20 minutes.
- The vaginal route is recommended. However, nulliparous women who have not used tampons and are not sexually active, may find a vaginal electrode difficult and painful to insert.
- Patients should "join in" with the electrically induced contraction.
- Neuromuscular electrical stimulation is a treatment for women who demonstrate a grade 0, 1 (or possibly grade 2) on the modified Oxford scale and would otherwise be unable to re-educate their pelvic floor muscles.
- Once a grade 3 voluntary contraction is achieved, electrical stimulation may be discontinued and physiotherapy continued with pelvic floor exercises.
- Battery operated home stimulation units should be used between treatments.

#### **3.6.4 Precautions:**

- Altered vaginal sensation.
- Selection of appropriate stimulation parameters to avoid muscle damage.
- Patients with epilepsy should only be treated following consultation with an appropriate medical practitioner.

### 3.6.5 Contraindications

- Patients who do not comprehend instructions and are unable to co-operate.
- Implanted pacemaker (especially demand type).
- Application of electrodes over active or suspected malignant tumours.
- Severe allergic reaction to electrode or electrode gel.
- Inflammation and/or infection of the vulva and vagina.
- Recent or current haemorrhage/haematoma.
- Open wounds and/or abrasions in the area of stimulation.
- Compromised circulation.
- Atrophic vaginitis.
- Pregnancy.\*
- Presence of abnormal or malignant cells in the pelvic or abdominal area.\*

#### \*New contraindications

### Additional contraindications to the use of Interferential Therapy

- Patients on anticoagulation therapy, history of pulmonary embolism or deep vein thrombosis.
- Use of suction electrodes for patients who bruise easily.

However, there is little, if any evidence to support some of these contraindications.

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# Summary of recommendations

## 4.1 Assessments

### Assessment of incontinence

- Initial assessment and continuous re-assessment are carried out.
- A proforma will facilitate the collection of relevant data.
- Evidence of a clinical examination and information gathered from the patient and other relevant sources, is recorded.
- A frequency/volume chart is completed before and after treatment.
- Urinalysis is carried out prior to treatment.

### Quality of life assessment

- A quality of life assessment is undertaken to assist in the overall evaluation of the outcome of the intervention.

### Patient education and management

- Patients are given information on the anatomy and physiology of the lower urinary tract and pelvic floor muscles.
- Information is given prior to any objective evaluation.
- Patient education is essential to assess the suitability for treatment.
- Ongoing education is essential for successful treatment.

### Pelvic floor assessment and informed consent

- Policies are in place to guide staff on the requirements for informed consent.
- Prior to assessment and treatment, patients' informed consent is obtained and recorded in their notes.
- The patient is given the opportunity to bring or have a chaperone.
- Standards of physiotherapy practice relating to privacy and dignity are adhered to.
- A digital assessment via the vagina is undertaken to assess correct pelvic floor muscle contraction.
- The PERFECT assessment scheme is used to provide a baseline measure of function.
- Women graded 0, 1 or 2 receive one of more of the following treatments: electrical stimulation, biofeedback and/or cones.
- Women graded 3,4 or 5 are offered pelvic floor muscle exercises.
- The results of the pelvic floor assessment are used to inform decisions about treatment.

### Precautions to carrying out a vaginal examination

- Patients who are pregnant and have a history of miscarriages or who have been advised to avoid sexual intercourse whilst pregnant. In these circumstances, vaginal examination or the use of any vaginal device should be avoided.
- Inflammation and infection of the vulva and vagina.
- Pelvic surgery in the previous three months.
- Psycho sexual problems.

## 4.2 Treatment options

### Adherence

- Written instructions for treatment are provided.
- Patients receive regular treatment sessions and contact with the therapist.
- Checks are made to ensure the patient understands the instructions.
- Individual goals for each patient, which minimise life style changes, are set.
- Positive feedback is given at every consultation.

### Pelvic floor muscle exercises

- Pelvic floor muscle exercises are used to reduce the symptoms of SUI.
- Pelvic floor muscle awareness is taught.
- The pelvic floor is assessed and exercised in functional positions.
- The use of anticipatory pelvic floor muscle contraction immediately prior to an activity that causes urine leakage ('the Knack') is taught.
- A programme of pelvic floor muscle exercises is tailored to individual patients and includes exercises for both fast and slow twitch muscle fibres.
- Pelvic floor muscle exercises are performed until the muscle fatigues, several times a day.
- Pelvic floor muscle exercises are practised for 15–20 weeks.
- Patients are initially seen weekly, but account may need to be taken of their circumstances and/or the available resources.
- Pelvic floor muscle exercises are continued on a maintenance programme.

### Biofeedback

- Biofeedback can be used to teach correct pelvic floor muscle exercise.
- In the absence of manometry and electromyography, other forms of biofeedback should be used.
- Biofeedback can be used to increase motivation and adherence.

### Precautions to biofeedback

- Patients who are pregnant and have a history of miscarriages or who have been advised to avoid sexual intercourse whilst pregnant. In these circumstances, vaginal examination or the use of any vaginal device should be avoided.
- Inflammation and/or infection of the vulva and vagina.
- Pelvic surgery in the previous three months.
- Psycho-sexual problems.

### Cone Therapy

- Cone therapy can be used as a useful exercise and biofeedback device even for patients without a palpable voluntary contraction.

### Precautions to cone therapy

- Patients who are pregnant and have a history of miscarriages or who have been advised to avoid sexual intercourse whilst pregnant. In these circumstances, the use of vaginal devices should be avoided.
- Moderate and severe prolapse.
- Inflammation and/or infection of the vulva and vagina.
- Menstruation, and within 2 hours of intercourse, due to excess secretions.
- Pelvic surgery in the previous three months.
- Psycho-sexual problems.

### **Neuromuscular electrical stimulation (NMES)**

- The selection of safe and suitable electrical parameters is important. The GDG recommends the following, although different parameters have also produced effective pelvic floor muscle training:  
Frequency: 35Hz  
Pulse width: 250µs (0.25ms)  
Current type: bi-phasic rectangular  
Intensity: maximum tolerated  
Duty-cycle: 5s on/10s off. Very weak muscles: 5s on/15s off  
Treatment daily/twice daily (home treatment)  
Treatment time: 5 minutes initially, gradually increasing to 20 minutes.
- The vaginal route is recommended.
- Patients should "join in" with the electrically induced contraction.
- Neuromuscular electrical stimulation is a treatment for women who demonstrate a grade 0, 1 (or possibly grade 2) on the modified Oxford scale and would otherwise be unable to re-educate their pelvic floor muscles.
- Once a grade 3 voluntary contraction is achieved, electrical stimulation may be discontinued and physiotherapy continued with pelvic floor exercises.
- Battery operated home stimulation units should be used between treatments.

### **Precautions**

- Altered vaginal sensation.
- Selection of appropriate stimulation parameters to avoid muscle damage.
- Patients with epilepsy should only be treated following consultation with an appropriate medical practitioner.

### **Contraindications to the use of NMES**

- Patients who do not comprehend instructions and are unable to co-operate.
- Implanted pacemaker (especially demand type).
- Application of electrodes over active or suspected malignant tumours.
- Severe allergic reaction to electrode or electrode gel.
- Inflammation and/or infection of the vulva and vagina.
- Recurrent or current haemorrhage/haematoma.
- Open wounds and/or abrasions in the area of stimulation.
- Compromised circulation.
- Atrophic vaginitis.
- Pregnancy.\*
- Presence of abnormal or malignant cells in the pelvic or abdominal area.\*

#### **\*New contraindications**

### **Additional contraindications to the use of Interferential Therapy**

- Patients on anticoagulant therapy, history of pulmonary embolus or deep vein thrombosis.
- Use of suction electrodes for patients who bruise easily.

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## Search strategies

The Centre for Review and Dissemination (1996) report informed the search strategies for the databases used for this guideline.

### Medline search strategy to identify systematic reviews

- #1: (meta-analysis or review literature).sh.
- #2: meta analy\$.tw.
- #3: metaanal\$.tw
- #4: meta-analysis.pt.
- #5: review,academic.pt.
- #6: case report.sh
- #7: letter.pt.
- #8: historical article.pt.
- #9: review of reported cases.pt.
- #10: review,multicase.pt.
- #11: review literature.pt.
- #12: 1 or 2 or 3 or 4 or 5 or 11
- #13: 6 or 7 or 8 or 9 or 10
- #14: 12 not 13
- #15: animal.sh.
- #16: human.sh.
- #17: 15 (not 15 and 16)
- #18: 14 not 17
- #19: The subject search terms were inserted here
- #20: 18 and 19

### Medline search strategy to identify randomised controlled trials

- #1: randomized controlled trial.pt.
- #2: randomised controlled trials.sh.
- #3: random allocation.sh.
- #4: double blind method.sh.
- #5: single blind method.sh.
- #6: 1 or 2 or 3 or 4 or 5
- #7: animal.sh.
- #8: human.sh.
- #9: 7 not (7 and 8)
- #10: 6 not 9
- #11: clinical trial.pt.
- #12: exp clinicaltrials.sh.
- #13: (clin\$ adj3 trial\$).ti,ab.
- #14: ((singl\$ or doubl\$ or treb\$ or tripl\$) adj3 (blind\$ or mask\$)).ti,ab.
- #15: placebos.ab.
- #16: placebo\$.ti,ab
- #17: random.ti,ab.
- #18: research design.sh.
- #19: 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18
- #20: 19 not 9
- #21: 20 not 10
- #22: comparative study.sh.

- #23: exp evaluation studies.sh.
- #24: followup studies.sh.
- #25: prospective studies.sh.
- #26: (control\$ or prospectiv\$ or volunteer\$).ti,ab.
- #27: 21 or 22 or 23 or 24 or 25
- #28: 26 not 9
- #29: 28 not (10 or 21)
- #30: the search terms were added here
- #31: 30 and (10 or 21 or 29)

#### **Medline search strategy for subject**

- #1: exp urinary incontinence/
- #2: exp stress/
- #3: 1 and 2
- #4: exp urinary incontinence, stress/
- #5: anatomy/ or "anatomy".mp.
- #6: 3 and 5
- #7: 4 and 5
- #8: limit 7 to (human and english)

#### **Search strategy used for AMED and CINAHL**

- 1 urinary incontinence.mp [mp=abstract,heading words,title]
- 2 stress incontinence.mp.[mp=abstract, heading words, title]
- 3 (physical therapy or physiotherapy).mp.[mp=abstract,heading words,title]
- 4 cones.mp. [mp=abstract,heading words,title]
- 5 urodynamics.mp. [mp=abstract,heading words,title]
- 6 electric stimulation.mp. [mp=abstract,heading words,title]
- 7 pelvic floor.mp. [mp=abstract,heading words,title]
- 8 biofeedback.mp. [mp=abstract,heading words,title]
- 9 anatomy.mp. [mp=abstract,heading words,title]
- 10 physiology.mp. [mp=abstract,heading words,title]
- 11 1 and 2 and 3
- 12 3 and 4
- 13 1 and 2 and 6
- 14 3 and 7
- 15 1 and 2 and 8
- 16 1 and 2 and 9 and 10
- 17 1 and 9
- 18 1 and 10
- 19 physical therapy.mp. [mp=abstract,heading words,title]
- 20 physiotherapy.mp. [mp=abstract,heading words,title]
- 21 19 or 20
- 22 1 and 21
- 23 1 and 22

## Guidelines for appraisal of research articles

Adapted from Bury and Mead, (1998) and the Centre for Reviews and Dissemination, (1996)

	yes	no	not stated
<b>Title</b>			
Was the title relevant to the paper?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Abstract</b>			
Did the summary include the main points?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Author</b>			
Did the author apply or use physiotherapeutic techniques or modalities in a way that was theoretically and conceptually sound?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Key words</b>			
Were they appropriate, did they represent content of article?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Introduction</b>			
Was the literature search adequate, up to date?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was the background information comprehensive and come from a range of sources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the aims and objectives of the study clearly defined and focused?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Method</b>			
Was the sampling strategy clearly identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was ethical consent mentioned?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did the authors consider issues of confidentiality or anonymity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were valid and reliable outcome measures used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If apparatus was used was it used correctly and in an appropriate manner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were all aspects of procedure correct? e.g. was randomisation conducted correctly, were group comparisons correctly identified, were any factors that could produce bias identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was the data collection carried out in a valid and reproducible manner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



	yes	no	not stated
<b>Results</b>			
Were all the results reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the results interpreted appropriately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were there any discrepancies in the results reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the results relevant to the aims and objectives of the study or the stated research question?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the results within the range that could be considered realistic for the given situation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the results represented appropriately and correctly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the statistical tests chosen appropriately and were they applied and interpreted correctly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Discussion</b>			
Were the aims and objectives addressed in the discussion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were important points highlighted in the discussion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the points brought forward related to other works in the field?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were any weaknesses in the methodology discussed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were all the results discussed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was the clinical significance of the results discussed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was the project funded?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Conclusions</b>			
Were the conclusions based on the results?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the findings likely to be clinically important?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Recommendations (if any)</b>			
Are the recommendations transferable to a clinical setting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>References</b>			
Were key papers included?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the papers up to date?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the papers relevant?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**References**

Bury T, Mead J. (1998) *Checklist for critical appraisal* (Appdx 1). In: Evidence-based healthcare: a practical guide for therapists. eds. T Bury, J Mead. Butterworth Heineman, Oxford.

Centre for Reviews and Dissemination. (1996) *Guidelines for those carrying out or commissioning reviews*. No 4. University of York.

# Appendix 2

## Summery sheet for each article

	yes	no
Is the methodology satisfactory?	<input type="checkbox"/>	<input type="checkbox"/>
Is it clinically relevant?	<input type="checkbox"/>	<input type="checkbox"/>
Is it a key reference?	<input type="checkbox"/>	<input type="checkbox"/>

## Evidence Categories

	tick
1 Based on well-designed randomised controlled trials, meta-analysis or systematic reviews.	<input type="checkbox"/>
2 Based on well-designed cohort or case control studies.	<input type="checkbox"/>
3 Based on uncontrolled studies or consensus.	<input type="checkbox"/>

## Overall summary in one or two sentences

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## Comments

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## **Guideline appraisal instrument for external reviewers**

### **Yorkshire region physiotherapy**

#### **Evidence based clinical guideline project**

#### **Clinical guideline appraisal for external reviewers**

Title of Guideline:

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Name of Reviewer:

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Date:

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# Appendix 3

Please tick appropriate box

	yes	no	not stated or unclear in guideline	unable to answer
1 Is the purpose of the guideline clear?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Does the guideline state the type of clinician it is intended for?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Is the subject of the guideline clear?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Is the population to which it applies clearly identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Are all relevant disciplines/groups represented in the review process?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Have all reasonable clinical options been considered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Have all important potential outcomes been considered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Was an explicit and sensible process used to identify, select and combine evidence?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Was there a comprehensive search for evidence?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Was the process of evaluation valid?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 Is the level of evidence clear?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 Are practical, clinically important recommendations made?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 Do the guidelines identify or acknowledge areas of uncertainty?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 Is the overall balance of benefits and harm/costs discussed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 Are any potential funding or other sources of funding acknowledged?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 Is the guideline going to be piloted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 Has a review date been set?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Comments

To include overall appraisal of guideline, points for consideration and suggested amendment. If commenting on numbers 1–17, please identify by using the relevant number.

Thank you.

## External reviewers comments and suggestions

The following comments were received from external reviewers in 1998, prior to its initial submission for endorsement. Since then, in addition to amendments as a result of their assistance, the document has been further refined and updated following comments from the CSP's guideline reviewers and the Clinical Guidelines Endorsement Panel.

The GDG received many useful comments and suggestions and is grateful for the time the external reviewers gave to this process.

Below are a selection of observations and the GDG's responses to them:

- "Overall, well done! Should have been done a long time ago".
- "Carefully investigated and well documented".
- "A very useful reference and practice tool for physiotherapists".
- "A very specific document, detailing where physiotherapy treatment should be aimed – backed by evidence".
- "Brilliant!"
- No mention of a hand search.
- No comment on the status of the descriptive evaluation tool "Rings of Continenence".
- Layout difficult to follow.
- Lack of multidisciplinary involvement.
- A suggestion to include a patient and nurse in the review process.

### Responses

The hand search is now documented; the layout has been restructured to incorporate many of the suggestions made.

In relation to the evaluation tool "Rings of Continenence", the GDG recognises this is not a validated tool, but it is currently used widely by practitioners. An explanation of the tool can now be found in Appendix 7.

The aim of the document, to provide an evidence base for clinical practice for physiotherapists, has been made clearer (page 6, Objectives of the guideline).

The GDG's inclusion of patient and nurses comments in the review process was minimal. It accepts their opinions should have been more widely sought. The GDG acknowledges the potential benefits of a multidisciplinary approach to guideline development, and recommends this is taken into account when the guideline undergoes revision.

## Urinary continence assessment form

Name: \_\_\_\_\_  
 DOB: \_\_\_\_\_ Age: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone Number: (home) \_\_\_\_\_ (work) \_\_\_\_\_  
 Occupation/Hobbies: \_\_\_\_\_  
 Referral: \_\_\_\_\_ G.P. \_\_\_\_\_  
 Problem: \_\_\_\_\_  
 Duration: \_\_\_\_\_

	Initial	Disch		Initial	Disch
<b>Symptoms</b>			<b>Severity</b>		
Stress			Daily		
Urgency			>1/week		
Urge incontinence			<1/week		
Frequency			>1/month		
Nocturia			<1/month		
Nocturnal enuresis			Few drops		
Incomplete emptying			Wets underwear		
Pain			Wets outerwear		
Hesitancy			Runs down legs		
Family history			No. of pads per day		
Childhood problems			Size of pads		
Other: dyspareunia					
Coital incontinence					
<b>Frequency/Volume Chart</b>					
Freq. of void/24 hrs.					
Freq. of incont/24 hrs.					
Max. voided volume					
Min. voided volume					
No. of drinks/24 hrs.					
Caffeine/24 hrs.			Stop test*		

\*Patients should be advised not to perform stop test (see guidelines for completing form)

### History

Parity \_\_\_\_\_  
 Wt. Heaviest Baby \_\_\_\_\_  
 Types of Delivery \_\_\_\_\_  
 Menopausal State \_\_\_\_\_  
 Pregnant Yes / No / Planning \_\_\_\_\_  
 HRT Yes / No \_\_\_\_\_  
 When commenced HRT \_\_\_\_\_  
 Result of most recent smear test \_\_\_\_\_  
 Signature \_\_\_\_\_

### Surgical history

\_\_\_\_\_   
 \_\_\_\_\_   
 \_\_\_\_\_   
 Bowels: B/O \_\_\_\_\_ week   
 Faecal incontinence \_\_\_\_\_   
 Faecal urgency \_\_\_\_\_   
 Constipation \_\_\_\_\_   
 Stool type \_\_\_\_\_   
 Date \_\_\_\_\_

**Medical History**

Cystitis \_\_\_\_\_  
 Smoking \_\_\_\_\_  
 Respiratory problems \_\_\_\_\_  
 Allergies \_\_\_\_\_  
 Cardiac problems \_\_\_\_\_  
 Diabetes \_\_\_\_\_  
 Back/neck problems \_\_\_\_\_  
 Other \_\_\_\_\_  
 Current medication \_\_\_\_\_  
 Previous treatment (including medication) \_\_\_\_\_  
 \_\_\_\_\_

Height \_\_\_\_\_  
 Weight \_\_\_\_\_

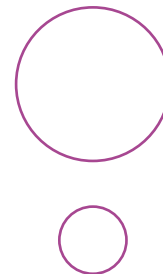
**Investigations**

Urinalysis \_\_\_\_\_  
 Urodynamics \_\_\_\_\_  
 Other \_\_\_\_\_

**On Examination**

Dermatomes \_\_\_\_\_  
 Myotomes \_\_\_\_\_  
 Reflexes \_\_\_\_\_

<b>Pelvic Floor – Digital</b>	<b>Initial</b>	<b>Disch</b>
012345 Oxford Grading		
Endurance		
Repetitions		
Fast contractions		
Perineometer (type) reading		
Hold with cough		



**If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?**

<b>Quality of life due to urinary symptoms</b>	<b>Initial</b>	<b>Disch</b>
Delighted		
Pleased		
Mostly satisfied		
Mixed equally satisfied and dissatisfied		
Mostly dissatisfied		
Unhappy		
Terrible		

Signature \_\_\_\_\_  
 Date \_\_\_\_\_

## **Guidelines for completion of urinary continence assessment form**

### **Occupation/hobbies**

This information is required in order to advise patients regarding necessary precautions e.g. brace pelvic floor and abdominal muscles before lifting.

### **Symptoms**

On initial and discharge assessment, place a tick if patient reports symptom present, 'o' if symptom not present, or relevant number.

### **Pain**

This refers to pain in the region of the bladder.

### **Severity**

Tick one only for frequency, and one (or more than one) for quantity of incontinence. Size of pads:  
- panty liner, small, medium or large, or combination of these.

### **Stop test**

This is contra-indicated. It is included in the assessment form to remind clinicians to advise patients NOT to practise stopping and starting mid-stream, because this interferes with micturition reflexes, and could potentially cause reflux of urine to kidneys (Bump RC et al, 1991).

### **Smear test**

This is included because medium/high frequency neuromuscular stimulation currents e.g. (interferential therapy) are thought to be contra-indicated in patients with cervical or other pelvic cancers.

### **Surgical history**

Record relevant surgical history, with date and reason for operation e.g. 1980. Total abdominal hysterectomy for fibroids.

### **Medication**

List all prescribed and over-the-counter medications.

### **Investigations**

Urinalysis (by doctor, physiotherapist or nurse) should be carried out.



## **Pelvic Floor**

After vaginal examination, complete this section using the PERFECT system of pelvic floor muscle grading. This will enable the planning of a patient specific exercise programme.

P - power. 0 to 5 on the Oxford scale.

E - endurance. Duration of maximum contraction (up to 10 seconds)

R - repetitions. Number of repetitions of maximum hold, with 4 seconds rest between each contraction.

F - number of fast maximum contractions.

E - every

C - contraction

T - timed

...this reminds the clinician to assess the pelvic floor muscles and then to prescribe the appropriate exercise programme.

## **Ring of continence**

This is described in Appendix 7, Vaginal/Anal Examination Chart

## **References**

Bump RC, Hart WG, Fantl A, Wyman JF. (1991) Assessment of Kegel pelvic muscle exercise performance after brief verbal instruction. *American Journal of Obstetrics and Gynaecology*. 165: 322-9.

# Appendix 6

## Bladder record chart (frequency and volume)

Name \_\_\_\_\_

Date \_\_\_\_\_

Please complete this chart and bring it with you.

	Day 1			Day 2			Day 3			Day 4		
	In	Out	Wet	In	Out	Wet	In	Out	Wet	In	Out	Wet
6 am												
7 am												
8 am												
9 am												
10 am												
11 am												
12 Noon												
1 pm												
2 pm												
3 pm												
4 pm												
5 pm												
6 pm												
7 pm												
8 pm												
9 pm												
10 pm												
11 pm												
12 mn												
1 am												
2 am												
3 am												
4 am												
5 am												
TOTAL												

### Instructions

- In** When you have a drink, place a tick in this column opposite the appropriate time.
- Out** Pass urine into a measuring jug, and record the amount in this column opposite the appropriate time. If you are unable to measure, place a tick in the column.
- Wet** Place a W in this column each time you wet yourself. This includes one drop or enough to wet your clothes.

**Information regarding the frequency/volume chart**

Completed frequency/volume charts provide objective information on fluid intake, the time and number of voidings, the voided volume and episodes of leakage. The chart can be adapted to be used to record episodes of urgency and the number of pads used. It can also be used in the assessment of voiding disorders, and in monitoring the outcome of on-going treatment. Further information on the type and quantity of drinks and the severity of incontinence can be ascertained from the patient at their first appointment.

There is some conflict of opinion between practitioners as to whether charts should be filled in by patients prior to attendance or following first attendance. There is no evidence to support either method. Practitioners should therefore use their own judgement. The chart should be repeated to monitor progress.

**Interpretation of the frequency/volume chart**

- A reasonable fluid intake is between 1 and 2 litres per day. Many patients reduce fluid intake in an effort to control incontinence.
- In most adults, the bladder will hold a maximum of 400–600 ml of urine at capacity (Abrams et al, 1983). A patient with stress incontinence usually records the largest volume after a period of sleep. During the day, variable volumes, with some below 50ml are often recorded. This reflects the so-called "just in case" pattern of voiding prior to anticipated stress, rather than waiting for a desire to void.
- Abrams et al (1983) suggested that "normal" diurnal frequency of micturition was probably between 4 and 8 times per day.

**Reference**

Abrams P, Feneley R, Torrens M. (eds.)(1983). *Urodynamics*. Springer-Verlag, Berlin. 6–27.

## Vaginal/anal examination chart

The Rings of Continence (RoC) used on this Vaginal/anal examination chart is a simple scheme to enable the results of perineal observation and vaginal and anal palpation to be recorded on two circles (Rings). The larger circle represents the vagina and the smaller circle the anal canal. Assessment data can be recorded on the circles in the appropriate position.

For example, a scar is represented in such a way as to indicate the length and position of any scars observed (Figure 2). An anterior vaginal wall defect, called a cystocele (Wall, 2001) is drawn and labelled as shown in Figure 1. This line denotes a bulge into the anterior vaginal wall with the patient straining, and the greater the bulge (prolapse), the deeper the line. Likewise, a posterior vaginal wall prolapse is represented by the lower line(s). Prolapses can be graded in a number of ways and the following is used in this guideline:

- 1° - mild prolapse, denotes a bulge into the vagina on straining which does not reach the introitus
- 2° - moderate prolapse is a bulge which is seen at the introitus on straining
- 3° - severe prolapse is seen as a vaginal wall bulge outside the body.

The following technique may help the clinician to differentiate between the different types of prolapse: if the examining index finger lies below the prolapse it must be emanating from the anterior vaginal wall and if the finger lies above the bulge, then the clinician is palpating a rectocele. If the prolapse can be pushed back inside the vagina, and does not appear to be arising from either the anterior or posterior vaginal walls, then this could be a uterine prolapse.

Other assessment data is represented and described in Appendix 5.

This schematic way to record assessment data is only as accurate as the clinician carrying out the examination.

### Reference

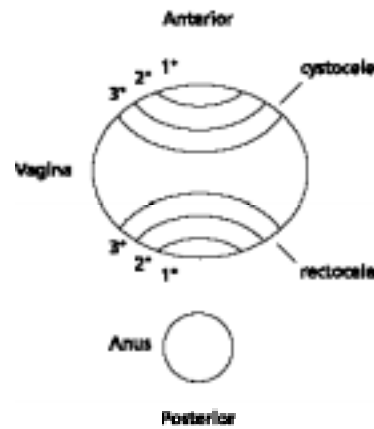
Wall L, Glowacki C. *Prolapse*. In: Therapeutic management of incontinence and pelvic pain. eds. J Laycock, J Haslam. Springer-Verlag, London. In Press.

## Vaginal/anal examination chart

The large 'Ring of Continence' <sup>1</sup> represents the vagina, and the small ring represents the anal canal. This diagram should be completed following observation and digital palpation, using the accompanying guidelines. Please refer to Glossary for further details.

**Figure 1**

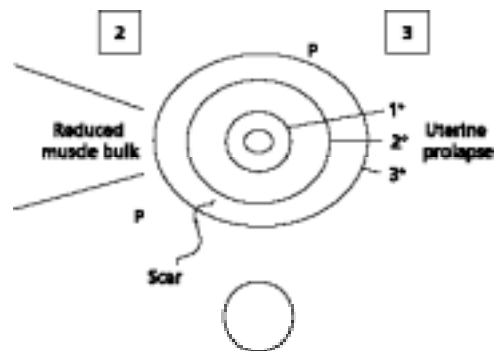
'Rings of Continence' showing vaginal wall prolapse i.e. grades of anterior (cystocele) and posterior (rectocele) vaginal wall defects.



**Figure 2**

Rings of Continence showing grades of uterine prolapse, scar(s) and areas of pain: P=severe pain, p=mild pain. Reduced muscle bulk and modified Oxford Grading on each side.

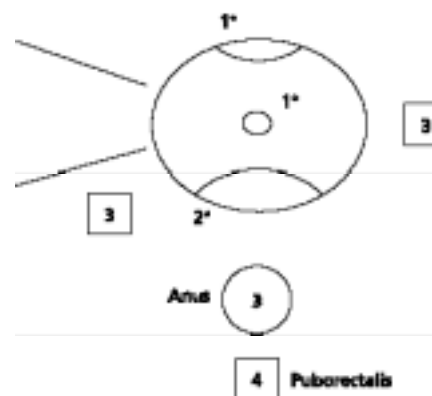
i.e. 2 3



**Figure 3**

Completed Ring of Continence for patient presenting with:

1° cystocele, 2° rectocele, 1° uterine descent, area of reduced muscle bulk @ 9.o'clock, and grade 3 muscle contraction at right and left. Anal examination: Puborectalis grade 4 and external anal sphincter grade 3



<sup>1</sup> Whilst this method of representing the results of observation and digital palpation have not been studied for validity, reliability and responsiveness, it is widely used amongst physiotherapists, and is recommended by the GDG.

Key:

1° = mild

2° = moderate

3° = severe

## Glossary

### **Cystocele**

Prolapse of the bladder through the anterior vaginal wall.

### **Cystometry**

The method by which the pressure/volume relationship of the bladder is measured. Used to assess detrusor muscle activity, sensation, capacity and compliance.

### **Dyspareunia**

Pain during sexual intercourse.

### **Genuine Stress Incontinence (GSI)**

The involuntary loss of urine occurring when, in the absence of a detrusor contraction, the intravesical pressure exceeds the maximum urethral pressure, diagnosed by cystometry.

### **M.S.U.**

Mid – stream specimen of urine.

### **Nocturia**

The patient is awakened by a sensation of urgency to urinate.

### **Nocturnal enuresis**

An involuntary loss of urine during sleep.

### **Parity**

Number of births.

### **Prolapse (bladder, bowel or uterus)**

- 1° - Mild: palpable, visible with a speculum
- 2° - Moderate: visible at the level of the introitus on straining
- 3° - Severe: outside the body.

### **Rectocele**

Prolapse of the rectum through the posterior vaginal wall.

### **Reflexes**

Reflexes of the perineum and lower limbs.

### **Stress urinary incontinence (SUI)**

The involuntary loss of urine from the urethra, synchronous with physical exertion (e.g. coughing).

### **Urge incontinence**

The involuntary loss of urine associated with a strong desire to void (urgency).

Urgency may be associated with two types of dysfunction:

- (a) Overactive detrusor function (motor urgency)
- (b) Hypersensitivity (sensory urgency).

### **Urodynamics**

The assessment of function and dysfunction of the urinary tract by an appropriate method.



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