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Margie Polden Memorial Lecture: Prolapse: the role of physiotherapy in its management and prevention

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Abstract
Physiotherapists have treated women with pelvic organ prolapse (POP) for many years. The basis for this treatment is the logical application of research evidence for the conservative management of urinary incontinence and anecdotal evidence. However, the past few years have seen an increase in research specific to POP. This paper outlines the journey involved in adding a large randomized controlled trial of the effectiveness of a pelvic floor muscle training (PFMT) programme for POP to the evidence. In addition, new prolapse-related research that has evolved in this same time frame is outlined. We can now say that there is good evidence to support conservative management of POP in the form of PFMT. Although to date there are still no specific guidelines for conservative management of POP, there is now a sufficient body of evidence to begin the development of such guidelines.

Keywords: evidence, pelvic floor muscle training, pelvic organ prolapse, research.

Introduction

Thank you for the invitation to deliver the 2011 Margie Polden Memorial Lecture; this is a great honour. It is a special pleasure to be speaking at this conference because it takes place in Glasgow, the city in which I studied for my degree and the one that I regard as my home. Furthermore, it is particularly important to present my lecture to this amalgamated conference of the Association of Chartered Physiotherapists in Women's Health (ACPWH) and the International Continence Society (ICS).

I completed the Association of Chartered Physiotherapists in Obstetrics and Gynaecology (ACPOG) course in 1991 in order to become a full member of ACPOG (as ACPWH was known at that time). *Physiotherapy in Obstetrics and Gynaecology* (Polden & Mantle 1990) was the textbook for this specialty to which we all referred. It contains one paragraph, which is 14 lines long, on physiotherapy management of pelvic organ prolapse (POP), and the authors make two main points:

(1) patients with mild forms of all types of prolapse "will benefit from physiotherapy directed at strengthening the pelvic floor muscles [PFMs] together with attention to chest infections, obesity, constipation and workloads"; and
(2) "it makes good sense for all patients to be offered an intensive 6–8-week period of specialist physiotherapeutic treatment before surgery is mooted or once they are placed on the surgical waiting list. In any case, surgery will be delayed whenever practicable until childbearing is complete; physiotherapy or a pessary may help tide a woman over until then" (Polden & Mantle 1990, pp. 304–305).

The reader is referred to the pelvic floor strengthening chapter and references related to PFM exercises (PFMEs) for the treatment of urinary incontinence. At the time, this was the evidence base for physiotherapy management of POP.

It is just over 10 years since my interest in POP-related research began, and it is coincidental (because of a one-year extension to the original research grant) that the findings of the large randomized controlled trial (RCT) investigating the effectiveness of Pelvic Organ Prolapse PhysiotherapY (POPPY) (Hagen *et al*. 2011a) can be

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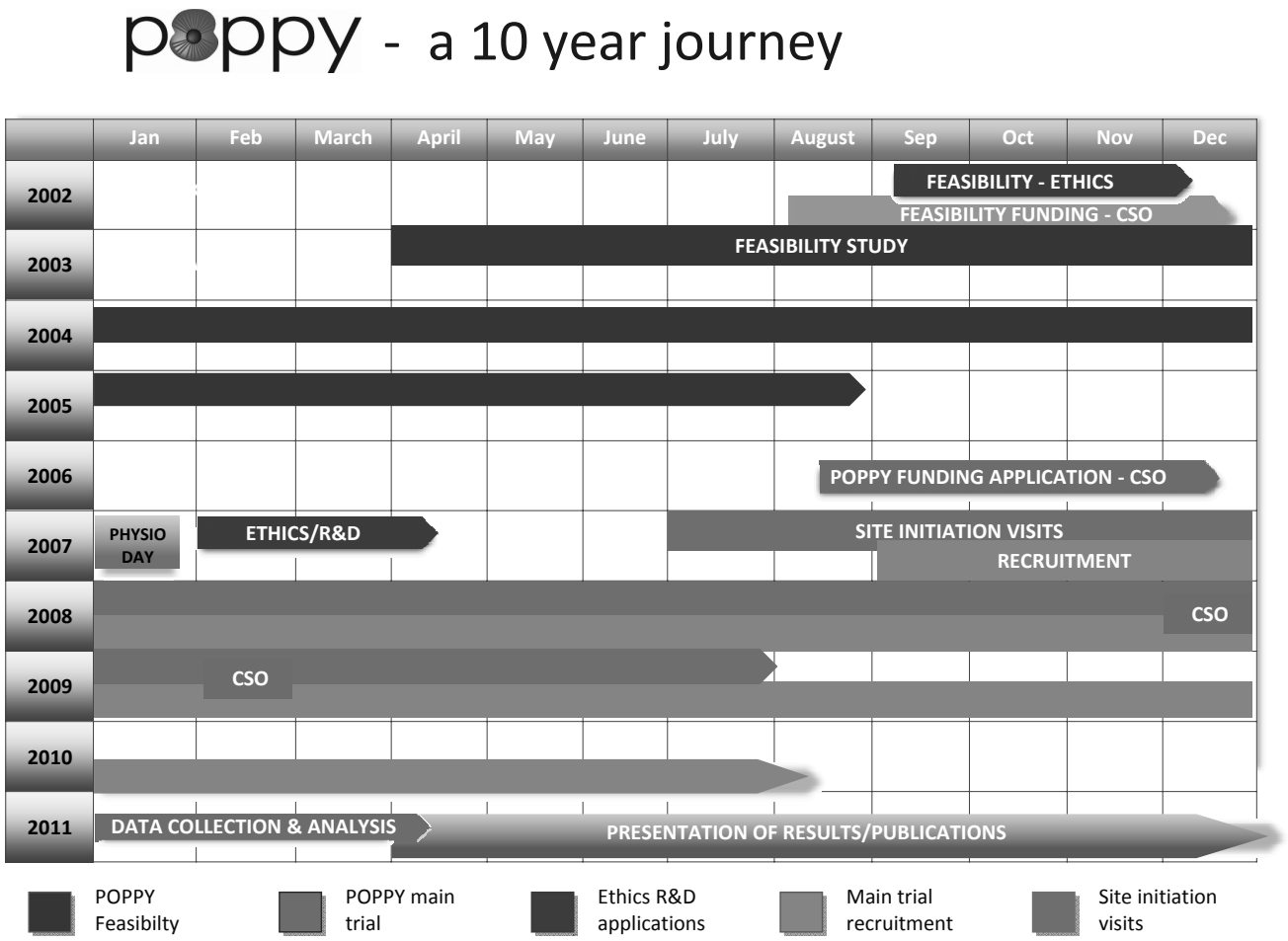

Figure 1. Pelvic Organ Prolapse PhysiotherapY (POPPY) trial: the research journey.

presented at this conference. This research is the result of an initial collaboration between myself and Professor Suzanne Hagen, Project Leader and Statistician at the Nursing, Midwifery and Allied Health Professions Research Unit, Glasgow Caledonian University). The POPPY trial is the largest multicentre RCT investigating PFM training (PFMT) for POP to have been conducted to date. For this Memorial Lecture, I will reflect on my research journey, and also report on new research into POP management and prevention. The production of good science is a slow process, and while we were working on our research, many others were involved in their own projects.

Background

My original research idea was complex, and it was collaboration with Suzanne Hagen that resulted in the discussions that led to the simplification of the research question. The final aim for the POPPY study was to determine the clinical value and cost-effectiveness of individualized PFMT in the management of women with POP. However, 10 years ago, there was no evidence in support of physiotherapy for POP or of what physiotherapists were then doing for women with POP. Therefore, many research projects were initiated from this one idea. The first steps were to survey current physiotherapy practice (Hagen *et al.* 2004), go over the current evidence in the form of a Cochrane Review, which was first published in 2004 and updated in 2006 (Hagen *et al.* 2006a), and begin the POPPY feasibility study (Hagen *et al.* 2006b, 2009b). These three projects ran concurrently.

Figure 1 summarizes the sequence of events from the original idea, including the feasibility study that began in 2002 (Hagen *et al.* 2009b), and overlapping with this, the physiotherapy survey (Hagen *et al.* 2004) and the 2004 Cochrane Review. Also mentioned are the POP Quantification (POP-Q) study that took place in 2006 (Stark *et al.* 2010), the Cochrane Review update (Hagen *et al.* 2006b), and finally, the main POPPY study that started in 2007 (Hagen *et al.* 2011a) with the PEssary Plus PhysiotherapY for Pelvic Organ Prolapse (PEPPY) study (Hagen *et al.* 2011b) running simultaneously.

Definition of pelvic organ prolapse

Urogenital prolapse is defined as the symptomatic descent of one or more of the anterior vaginal wall, the posterior vaginal wall, and the apex of the vagina (cervix/uterus) or vault (cuff) after hysterectomy. Urogenital prolapse is measured using the POP-Q system (Bump *et al*. 1996). Furthermore, objective findings of POP in the absence of relevant prolapse symptoms may be termed ''anatomic prolapse'' (Abrams *et al*. 2009). In 2002, when my research journey started, there was no such definition available; however, Swift *et al*. (2003) highlighted the need for a definition that included reference to symptoms and not only clinical signs. Several authors have since discussed the non-specific nature of POP symptoms and their lack of association with anatomical measurements (Ellerkmann *et al*. 2001; Burrows *et al*. 2004). The only reliable symptom seems to be the sensation of a vaginal bulge that the woman can also see or feel; however, this is often associated with POP that is beyond the introitus (Swift *et al*. 2003).

Measuring prolapse symptoms

The symptoms of POP are the main outcome measure for the POPPY study, and thus, a robust validated measure needed to be identified. The POP Symptom Score (POP-SS) (Hagen *et al*. 2009a) is a validated symptom score specifically designed for POP that was partly developed in the early stages of this research project because it was felt that there was no suitable validated tool available at the time. The POP-SS was validated in three specific groups of women: (1) those with symptomatic stage I or II POP; (2) those about to undergo surgery for POP; and (3) those with an unknown POP status. Its sensitivity to change was clearly shown. The POPPY feasibility study provided a small group of women with stage I or II POP for qualitative work on the POP-SS (Bugge *et al*. 2005).

Describing and measuring prolapse types and severity

Pelvic organ prolapse includes anterior vaginal wall prolapse (urethrocele or cystocele), posterior vaginal wall prolapse (enterocele or rectocele) and prolapse of the apical segment of the vagina (cervix/uterus, cuff or vault prolapse). The POP-Q system (Bump *et al*. 1996) is an objective, standardized and validated measure of POP recognized by the ICS that measures nine individual points from which a categorical stage is derived. It is used both within research and clinical practice to assess the extent of the prolapse and the outcome of treatment. The POP-Q assessment requires an internal vaginal examination that records nine individual predefined measures (Fig. 2). The six measures are the location, relative to the hymen, of points on the anterior (Aa and Ba), posterior (Ap and Bp) and apical (C and D) vagina, which allow a description of the extent of any descent. Negative and positive values indicate locations above and below the hymen, respectively. Additionally, the lengths of two external measures (perineal body and genital hiatus) and one internal measure (total vaginal length) are made. From these measures, a stage of prolapse is calculated (Fig. 3) based on the point of most prominent descent. The POP-Q stages constitute a five-level category, ranging from (0) a normal vaginal profile to (IV) complete vaginal eversion.

The POP-Q measurement is the main objective outcome measure for the POPPY study, and with this multicentre study, a standardized training method was of vital importance to ensure that the main objective outcome measure was used correctly across all centres. In 2006, we conducted a study to determine the feasibility and reliability of physiotherapists performing the POP-Q examination (Stark *et al*. 2010). This study was funded by the Physiotherapy Research Foundation and the Chartered Society of Physiotherapy Charitable Trust (project reference number: PRF/05/3). Two gynaecologists and six physiotherapists, two of whom had only 4 months of experience in women's health, participated as POP-Q examiners in the study. The development, implementation and evaluation of a POP-Q training package took place within the context of this study. A formal POP-Q training session of 1.5 h in duration covered: a verbal explanation of the POP-Q system; observation of the POP-Q DVD (AUS 1996); information on standardizing conditions for POP-Q examination (i.e. an empty bladder, a standardized examination position and methods for achieving the maximum descent of the prolapse); the equipment used (i.e. a ratchet-free speculum, a disarticulated speculum to retract the vaginal walls and measuring sticks); data collection (i.e. a grid to record/illustrate findings and note any comments during examination); and a question-and-answer session.

This study taught us much about the training required to use the POP-Q system and the lessons learned were carried forward into practice

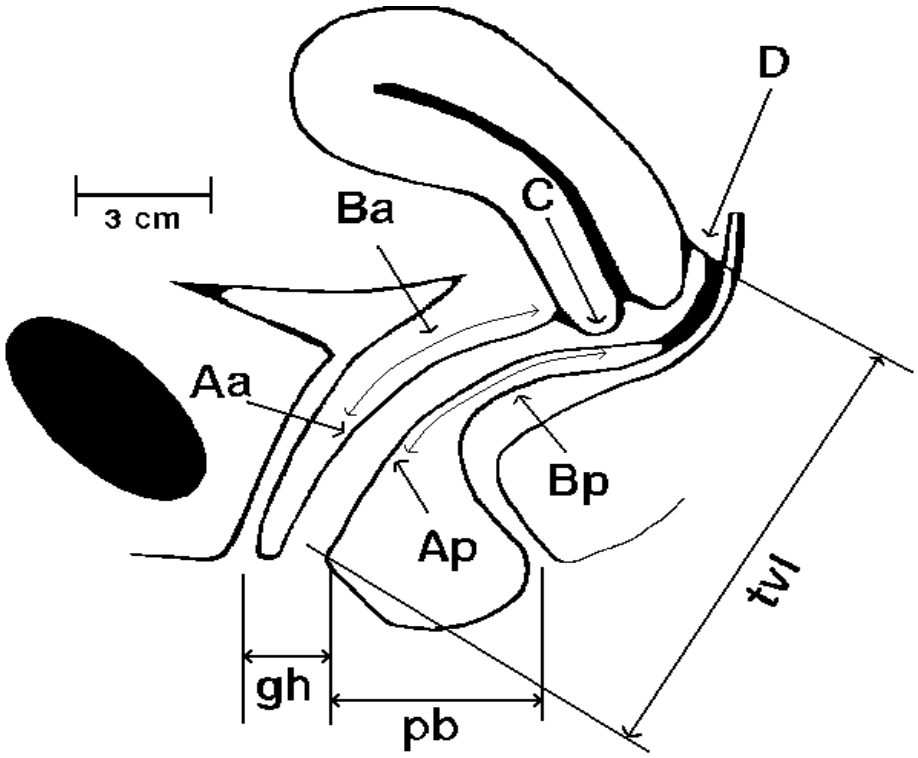

Figure 2. Pelvic Organ Prolapse Quantification (POP-Q) assessment points (Bump 1996): (Aa) anterior vaginal wall 3 cm proximal to the hymen; (Ba) most distal position of the remaining upper anterior vaginal wall; (C) most distal edge of the cervix or vaginal cuff scar; (D) posterior fornix (not applicable if post-hysterectomy); (Ap) posterior vaginal wall 3 cm proximal to the hymen; (Bp) most distal position of the remaining upper posterior vaginal wall; (gh) genital hiatus, measured from the middle of the external urethral meatus to the posterior midline hymen; (pb) perineal body, measured from the posterior margin of the genital hiatus to the middle of the anal opening; and (tvl) total vaginal length, i.e. the depth of the vagina when point D or C is reduced to normal position. Reproduced with permission from Bump *et al.* (1996).

for the main POPPY study. In addition, this POP-Q study provided an insight into physiotherapy training and education. The two physiotherapists who were on 4-month training rotations stated that learning new skills was a continual part of their professional lives, and therefore, a familiar experience: "[W]e have the advantage of . . . trying to do new skills every 4 months . . . so the POP-Q isn't really out of the ordinary" (physiotherapist E; present author, unpublished results). However, of the four physiotherapists with long-standing experience in women's health, three reported that they had reached stages in their careers where a lack of confidence in a professional skill was an unfamiliar experience that felt like a loss of control: ". . . and it completely threw me because I never feel like that" (physiotherapist C; present author, unpublished results).

Prevalence of pelvic organ prolapse

One community survey found that 40% of the general female population aged 45–85 years had evidence of POP of at least stage II (Slieker-ten

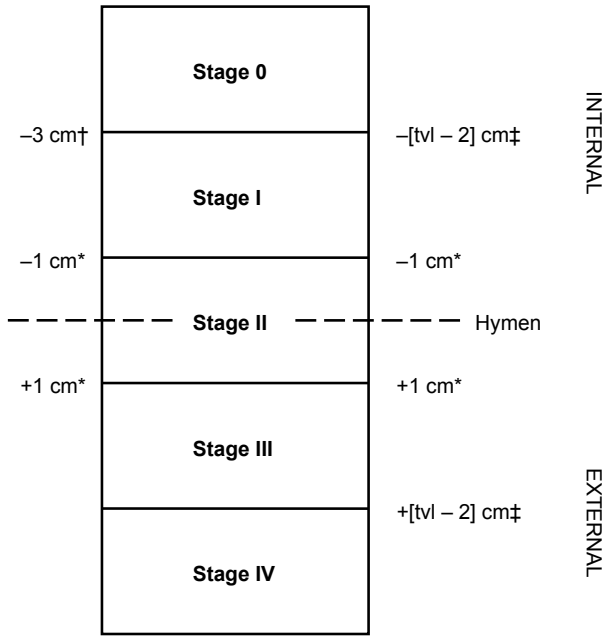

Figure 3. Pelvic Organ Prolapse Quantification (POP-Q) assessment staging diagram: (*) reference measurements apply for all points; (†) reference measurements apply for points Aa, Ba, Ap and Bp only; and (‡) reference measurements apply for points C and D only. See the legend to Figure 2 for definitions of abbreviations.

Hove *et al.* 2009). Swift (2000) found that 50% of women over the age of 50 years were reported to complain of symptomatic POP. In addition, around 23 000 POP repairs were performed in England in 2005–2006 (DH 2009), and Olsen *et al.* (1997) reported an 11.1% lifetime incidence of undergoing surgery for POP. The actual figure for women presenting for conservative treatment with symptomatic POP is likely to be somewhere in between the actual figures for surgery and the perhaps less exact figures for women presenting with symptomatic POP.

Aetiology

Bump & Norton (1998) proposed a model for the aetiology of pelvic floor dysfunction including factors that predispose (e.g. gender, race, family history of PFD and collagen), factors that incite (e.g. vaginal delivery through its effect on nerve damage, muscle damage, and tissue disruption, surgery and radiation), factors that promote (e.g. constipation, occupation, obesity and smoking) and factors that decompensate (e.g. co-morbidity, congestive heart failure, reduced mobility and/or dexterity). This model was further adapted by O'Dell & Morse (2008) to be more POP-specific, but the basic theory remains divided into factors over which we have control (e.g. promotion of lifestyle choices), and others over which we have little or no control (e.g. childbirth and genetics).

Excessive stretching and tearing, and multiple deliveries seem to be the main predisposing factors for symptomatic POP. Abdominal delivery emerged as a comparably strong protective factor (Tegerstedt *et al.* 2006). Larsson *et al.* (2009), who studied data for 1.4 million women linked with birth registry and an in-patient diagnosis of POP found that Caesarean section is associated with a lower risk of POP than vaginal delivery. Interestingly, Dolan & Hilton (2010) showed that Caesarean section provides incomplete or poorly sustained pelvic floor protection by middle age. The above authors found that obese women were at the highest risk and had the most severe symptoms of pelvic floor dysfunction. The Women's Health Initiative (WHI; Hendrix *et al.* 2002) found that almost one-fifth of nulliparous women had a prolapse of some degree, negating nulliparity as a means of prevention.

Lien *et al.* (2004) showed that the muscle fibres of the medial portion of pubococcygeus stretch by 3.26 times their normal length during childbirth and exceed by 217% the maximum point of stretching without any injury over non-gravida striated muscle. It is not clear why this extent of stretch during childbirth does not cause damage in the majority of women. It is the basis of further research for this group. DeLancey (2005) discussed the need for research into both the prevention and treatment of pelvic floor dysfunction. This landmark paper highlights the need for both prevention at the time of vaginal birth and improvements in surgical treatment. It is hoped that the use of ultrasound and magnetic resonance imaging of the PFMs will enhance our understanding of the mechanism of injuries. The more we learn about the mechanisms of injury, the more likely it is that we can properly tailor both prevention and treatment. In a review of the mechanism of perineal trauma during vaginal delivery, Bortolini *et al.* (2010) concluded that vaginal delivery is the main aetiological agent of pelvic floor dysfunction, and that research needs to look at the role of genetic predisposition in order to develop preventative strategies for the individuals who are most at risk.

In a population-based, cross-sectional study derived from 5489 women from Stockholm, Sweden, Miedel *et al.* (2009) found that age and parity were the dominant risk factors for POP, but that there were also significant associations with congenital susceptibility and non-obstetric strain on the pelvic floor (e.g. overweight/obesity, heavy lifting and constipation). These authors concluded that individual predisposition and lifestyle may play an important role in the aetiology of prolapse. Obesity was cited as an independent risk factor for pelvic floor dysfunction by Dolan & Hilton (2010) in a survey of 3002 women. Once POP has developed, obesity is a risk factor for progression (Bradley *et al.* 2007). According to the WHI, a body mass index greater than $30\,kg\,m^{-2}$ increases the risk of prolapse by 40–75% (Hendrix *et al.* 2002). Whitcomb *et al.* (2009) showed a significant trend towards an increasing degree of POP and stress urinary incontinence with an increasing degree of obesity, and also that these findings were not associated with either mode of delivery or parity.

When managing POP, we often look at the evidence base for urinary incontinence (Polden & Mantle 1990; Hagen *et al.* 2004; Bø 2006). Recent evidence from a study by Wing *et al.* (2010) of 338 women with urinary incontinence showed that weight losses of between 5% and

10% of body weight were sufficient for significant urinary incontinence benefits. Women were randomized to a 6-month weight-loss programme, followed by 12-month maintenance programme, and compared to others in a structured education programme. The above authors concluded that weight loss should be considered as an initial treatment for incontinence in overweight and obese women.

Pelvic organ prolapse symptoms are often reported to be worse after activities such as walking, lifting or a prolonged time standing. Sung *et al*. (2007) demonstrated considerable changes in POP symptoms associated with activity and time of day. Ali-Ross *et al*. (2009) showed that greater POP was found on POP-Q examination following physical activity, but this was not associated with worsening symptoms or greater impairment of quality of life (QoL). Women in strenuous occupations such as nursing (Jørgensen *et al*. 1994) have been shown to have an increased likelihood of undergoing surgery for POP.

Posture was first cited as a factor responsible for POP at the 1909 meeting of the American Association of Genitourinary Surgeons (Goldthwait 1910). Dr J. Goldthwait (1910, pp. 411–412) stated that "in the treatment of disturbances or displacements of the pelvic organs, it is only half doing the work if the condition is simply treated locally, while an imperfect posture which may have been largely responsible for the trouble is allowed to go uncorrected". More recently, evidence has begun to accumulate that supports this comment. Lind *et al*. (1996) found a statistically significant association between thoracic kyphosis and advanced uterine prolapse. Furthermore, Nguyen *et al*. (2000) found that women with advanced uterovaginal prolapse have less lumbar lordosis and a pelvic inlet that is oriented less vertically than women without prolapse, and Mattox *et al*. (2000) found a loss of lumbar lordosis to be a significant factor in the development of POP. An individualized posture-correction exercise programme may be indicated in the conservative management of POP.

Prevention

No studies specifically concerned with the prevention of POP were found in the preparation for this lecture. A study investigating the effectiveness of PFMT in the prevention of POP, the Prevention of Prolapse (PREVPROL) trial, is currently ongoing in Dunedin, New Zealand, with UK centres in Aberdeen and Birmingham. This study aims to determine the clinical value and cost-effectiveness of PFMT to prevent prolapse-specific symptoms, worsening prolapse severity and the need for prolapse treatment. The PREVPROL study is recruiting women from a previous study, PROlapse and incontinence: LONG-term research (ProLong) (Dean *et al*. 2006), who have no prolapse symptoms and have not sought treatment for prolapse, but who have had a POP-Q examination to determine the presence of anatomical prolapse.

Current treatment for prolapse

The main treatment options for prolapse are: do nothing or observe the POP status at regular intervals; conservative treatment (e.g. mechanical devices/pessaries, PFMT and lifestyle advice); and surgery.

Do nothing or observation

This is not as harsh as it seems! In a study of 280 women, Miedel *et al*. (2011) found that only a small proportion of women get worse within 5 years. Furthermore, in a retrospective review of 62 women who chose observation as the primary management approach for their POP, Gilchrist *et al*. (2011) found that 81% had no disease progression, as measured by POP-Q assessment, over 2 years. Sixty-eight per cent (42 of 62) chose continued observation for further management of their POP symptoms. Bradley *et al*. (2007, p. 848) showed that POP "waxed and waned yearly in individual women", but that obesity is a risk factor for progression.

Conservative treatment

Mechanical devices/pessaries. Pessaries are used as a first-line non-surgical treatment for prolapse by 75% of urogynaecologists (Cundiff *et al*. 2000). However, there is no evidence from RCTs upon which to base the treatment of women with POP through the use of mechanical devices/pessaries (Adams *et al*. 2004).

The PEPPY study reported at ICS 2011 with a poster presentation (Hagen *et al*. 2011b). This is a feasibility study funded by Wellbeing of Women and recruited from four centres that were already recruiting for the POPPY study between February 2008 and 2010. Women were eligible for entry to PEPPY if they were having a pessary inserted for first-line management of POP. Sixteen women were randomized. The

hypothesis that exercising the PFMs with a pessary *in situ* (to reduce the descent on pelvic organs and reduce soft-tissue stretching) will be more effective than either a pessary alone or PFMT alone is still to be tested in a large RCT.

Pelvic floor muscle training. Why might PFMT work for the management of POP?

The PFMs play a critical role in giving structural support to the pelvic organs and pelvic openings (DeLancey 1993). Pelvic floor muscle activity adjusts to variations in posture and intra-abdominal pressure (Morgan *et al*. 2005). Improving PFM function (i.e. strength, endurance and coordination) may improve this structural support for the pelvic organs. Kari Bø (2004, 2006) suggested that increasing muscle strength may hypertrophy and improve stiffness of the PFMs. Borello-France *et al*. (2007) also found that women with stage II prolapse were better able to elevate their pelvic floor than those with stage III or IV prolapse, and hypothesized that poor PFMs may be a contributory factor in prolapse development. The same authors also argued that, by the time women reach clinical care for prolapse, it is not possible to determine whether PFM weakness or POP came first. DeLancey *et al*. (2007) demonstrated that women with POP generated less vaginal closure force during a maximal voluntary contraction than controls. This same study found that women with POP had genital hiatuses that were 50% longer than those of controls. Other studies have also shown a larger genital hiatus to be associated with POP (DeLancey & Hurd 1998; Athanasiou *et al*. 2007; Dietz *et al*. 2008). Bræken *et al*. (2010b) showed that supervised PFMT can increase muscle volume, close the levator hiatus, shorten muscle length, and elevate the resting position of the bladder and rectum. Therefore, improving PFM strength in women with POP may have an important role to play in both the treatment and prevention of POP.

An intentional, effective PFM contraction prior to and during effort (e.g. a cough) has been shown to reduce leakage from stress urinary incontinence; this is known as "The Knack" (Miller *et al*. 1998). Bladder neck descent has been shown to be significantly lessened when women are asked to contract the pelvic floor prior to a cough than when coughing without contraction (Peschers *et al*. 2001). Thus, The Knack/PFM pre-contraction has become a standard element of PFMT for urinary incontinence (Dumoulin & Hay-Smith 2010). There are no studies in the literature that investigate at the usefulness of such a technique on the effect of POP. Carrière (2006) recommended pre-contracting the PFM not only during a cough, but for any daily task that results in increased intra-abdominal pressure. Activities involving raised intra-abdominal pressure have been cited in the aetiology of POP (Gill & Hurt 1998; Miedel *et al*. 2009), so it is logical to identify a way to help women with POP to counteract intra-abdominal pressure increases. It is possible to apply this principle of The Knack or pre-contracting the PFMs with any rise in intra-abdominal pressure to many activities such as coughing and lifting to prevent the descent not only of the bladder neck, but other pelvic organ structures for the treatment of POP.

Current evidence for PFMT. The Cochrane Review of conservative management of POP first published in 2004 discussed one paper (Piya-Anant *et al*. 2003). The review was updated 2 years later (Hagen *et al*. 2006a) and is being updated again at the time of writing. This first published trial, which considered the effect of PFMT on preventing anterior prolapse from worsening, had limitations that affect the general use and rigour of the findings (Piya-Anant *et al*. 2003). The trial focused on anterior prolapse only in a group that included both symptomatic and non-symptomatic women. Prolapse severity was measured in a non-standardized way and measurement of other important outcomes (e.g. prolapse symptoms) was not carried out. The above author's conclusion that the PFMT programme was effective for preventing the worsening of severe prolapse should be treated with caution.

Jarvis *et al*. (2005) were the first authors to describe a study to assess the effectiveness of PFMT as an adjunct to surgery. Women booked to have surgery for POP or incontinence were randomized to an intervention (one pre-operative and one post-operative physiotherapy appointment) or a control group (no physiotherapy appointments). Sixty women were randomized, but two of those women were not having surgery to correct POP. Outcome measures included urinary diaries and a pad test (to measure volume of urine leakage), PFM strength, bladder symptoms, and continence-related QoL. Follow-up was at 3 months. No prolapse-specific outcomes were measured. The authors concluded that peri-operative physiotherapy improves physical outcomes and QoL in

women undergoing corrective surgery for urinary incontinence and/or POP. The small numbers and short follow-up involved mean that further studies are needed in this area.

Ghroubi *et al.* (2008) reported a small trial carried out in Tunisia that was published in French with an English abstract. Forty-seven women with stage I or II cystocele (± stage I rectocele) were randomized to either a PFMT plus healthy living advice or a no-treatment group. The intervention included 24 clinic-based sessions (containing PFMEs, electrical stimulation and digital biofeedback) and lifestyle advice. Women were asked to perform 20 PFM contractions at home each day after the tenth session. Outcome measures included pelvic heaviness, urinary symptoms, PFM strength, QoL, urodynamics and patient satisfaction. Immediately after treatment, pelvic heaviness persisted in five women (19%) from the treatment group compared with 14 (70%) in the control group. It was reported that 20 women from the intervention group retained benefits 2 years after the treatment had ceased.

Research from our group (Hagen *et al.* 2009b) described a feasibility study designed to inform the development of a larger multicentre trial to assess the use of PFMT in the management of POP (the POPPY study). This feasibility study took place from 2002 to 2005, and randomized 47 women with stage I or II prolapse to intervention (five physiotherapy appointments) and control (lifestyle advice leaflet only). Pelvic organ prolapse was assessed by POP-Q examination at baseline and at 20 weeks post-randomization by a gynaecologist. A postal questionnaire (including assessment of symptoms and QoL) was completed by women at baseline, and 20 and 26 weeks post-randomization. Women in the intervention group demonstrated significantly greater improvement in their prolapse symptoms than controls, were significantly more likely to have an improved prolapse stage (45% versus 0%) and were significantly more likely to say that their prolapse was better (63% versus 24%).

Frawley *et al.* (2010) compared physiotherapist-led pre- and post-operative PFMT versus usual care in 48 women undergoing prolapse repair surgery, with or without hysterectomy. The intervention consisted of one pre-operative instruction session, eight post-operative appointments and a final appointment 9 months post-operatively. The control group received ''usual care'' provided by the surgeon and the hospital. Pelvic floor muscle strength (assessed by manometry and the Modified Oxford Scale), bladder and prolapse symptoms were measured at four time points: pre-operatively prior to randomization, and at 3, 6 and 12 months post-operatively. There were no significant differences in outcomes between the two groups.

Brækken *et al.* (2010a, b) randomized 109 women and their results were reported in two articles. The participants had stage I, II or III POP of any type (determined by POP-Q), and 63% reported symptoms of prolapse. The women in the PFMT group were instructed in PFMT for 6 months (weekly visits for 3 months, then fortnightly appointments) with home exercise (three sets of between eight and 12 close-to-maximal contractions daily). Both groups were given lifestyle advice and taught The Knack. The above authors concluded that PFMT is without adverse effects and can be used as a treatment for POP (Brækken *et al.* 2010a), and that it can increase muscle volume, close the levator hiatus, shorten muscle length, and elevate the resting position of the bladder and rectum (Brækken *et al.* 2010b).

Stüpp *et al.* (2011) randomized 37 women with stage II POP to intervention (seven appointments with a specialist physiotherapist over 14 weeks for PFMT, including a proprioceptive technique using vaginal cones and a home exercise programme) or control (instructed in PFM contractions, but no defined protocol). Both groups were given the same standardized lifestyle advice sheet. The control group did not see a physiotherapist. The primary outcome was a POP-Q assessment performed at baseline and 14 weeks by a gynaecologist who was blinded to the treatment group. Secondary outcomes were PFM function and symptom severity. The intervention group showed a greater improvement in POP-Q stage, muscle strength, muscle endurance and symptom severity than the control group. This study group are continuing to recruit to increase the sample size, but have concluded that PFMT is effective in the treatment of POP.

The POPPY study presented at ICS 2011 (Hagen *et al.* 2011a) randomized 448 women and is the biggest RCT by far to date. Women with newly diagnosed, symptomatic, stage I, II or III POP were randomized to a structured individualized PFMT programme, delivered in five, one-to-one appointments over 16 weeks, or a control group receiving only a lifestyle advice leaflet and no PFMT. The participants completed postal questionnaires at baseline (prior to randomiza-

tion), and 6 and 12 months. A 24-month follow-up is underway. The primary outcome is POP-SS at 12 months. Other key outcomes are prolapse severity (POP-Q), the women's perceived change in prolapse, the uptake of further treatment and cost-effectiveness. The intervention was found to be effective: compared to the control group, the women's prolapse symptoms were less frequent in the PFMT group at 6 and 12 months, they were more likely to report that their prolapse felt better, and they were less likely to seek further treatment. There was a tendency for a greater improvement in POP-Q stage in the intervention group. We concluded that there is now sufficient evidence to support PFMT in the management of POP. It is efficacious and cost-effective in reducing prolapse symptoms, and should be recommended as the first-line management for POP. Analysis of the results is ongoing and we hope to publish full results soon.

Surgery

Considering the surgical options for POP is beyond the scope of this lecture, but it is worth reading the relevant Cochrane Review (Maher *et al*. 2010) for a summary up-to-date of the evidence to date. The two trials of physiotherapy as an adjunct to surgery outlined earlier (Jarvis *et al*. 2005; Frawley *et al*. 2010) are also important.

Conclusions

The quest for an evidence base for our clinical practice has been slow, but we now have the scientific evidence to support PFMT for POP. As previously stated, those 14 lines about the physiotherapist's role in the management of POP in Polden & Mantle (1990) were based on evidence for urinary incontinence and anecdote. It is only in the past 10 years that we have seen a body of evidence develop to support the role of the physiotherapist in the management of POP. It is important that we also consider the contribution of lifestyle factors (e.g. non-obstetric strain on the pelvic floor) to POP management and prevention, and continue to address these.

Good-quality research is vital for our clinical and professional development. It is because of the evidence that current guidelines ensure that conservative management is the first-line treatment for urinary incontinence (NICE 2006); however, this is not true for POP. With the evidence that we now have, we are in a position to influence guidelines and referral pathways for the conservative management of POP. As a profession, we need to continue to follow up our good ideas, collaborate with researchers and strive for the best evidence to support our practice – even though this may take time.

Acknowledgements

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