Conservative Management of Stress Urinary Incontinence in Women:

A Scoping Review of the Literature

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Conservative Management of Stress Urinary Incontinence in Women: A Scoping Review of the Literature

Abstract

Purpose: Stress urinary incontinence is a serious threat to the well-being of women worldwide. It is still considered to be a taboo topic by many, and as a result women often do not discuss this condition with their primary health care providers. This review is focused on describing numerous conservative (non-surgical and non-pharmacological) treatment options that are currently available for women with this condition, identifying the benefits and drawbacks of these treatments, and drawing conclusions from existing empirical research about the treatments considered most efficacious. This information is important for health professionals and women worldwide who seek effective, low-risk treatments for stress urinary incontinence.

Method: A scoping review of the literature was the chosen method. Three electronic databases known to house nursing literature were searched using the key phrases “urinary incontinence”, “stress urinary incontinence” combined with “conservative management”, “alternative therapy” and “complimentary therapy”. The search was repeated using the key word “pessary” in combination with the key phrases. Eighty-eight articles met the selection criteria.

Results and Implications for Women’s Health: All forms of conservative treatment options have benefits, but most have some degree of negative implications, complications or adverse effects. Many options require that the woman be motivated and compliant with the treatment in order for it to be effective. Supervised pelvic floor muscle training (PFMT) was most
often investigated and was deemed more effective than any other conservative treatment modality. PFMT, combined with biofeedback and/or weighted vaginal cones, was also frequently investigated and reported to be effective. As a third option, vaginal pessaries of various types were found to be both efficacious and inexpensive. Articles included in this review were from 22 countries: a testament to the magnitude of this problem for women worldwide. It is hoped that nurses interested in this field of study and practice may find this summary review useful when attempting to sort through the plethora of information related to this topic.
Acknowledgements

I would like to begin by acknowledging and thanking my Supervisor, Dr. Elizabeth Andersen, and my Committee Member, Manuela Reekie, without whose continuous support and encouragement this project would not have been possible. I also want to thank Robert Janke, Learning Services Librarian at the University of British Columbia Okanagan, for his invaluable help in putting all the evidence in order. To my husband Tim, and my children, Matt, Shaunna, and Sarah, I want to thank you for enduring many years of “wife/Mom as student” and for always being supportive, encouraging, and loving. Finally, I would like to thank my Mother, Irene Donnelly, for her lifelong support.
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Chapter One

Stress urinary incontinence is the loss of urine that occurs at a time and/or place that is not convenient or appropriate, such as when one coughs, sneezes, engages in physical exertion, sports activities, or even sudden changes in position (Appell & Davila, 2007; Bray, VanSell, & Miller-Anderson, 2007; Markland, Vaughan, Johnson, Burgio & Goode, 2010). There are four reasons why loss of urine might occur: 1) as a result of pressure on the bladder that overcomes the person’s ability to hold the urinary sphincter closed, known as stress incontinence; 2) as a result of a sudden urge to urinate that cannot be controlled, known as urge incontinence; 3) as a result of the two combined, known as mixed incontinence; and 4) as a result of other conditions such as the loss of neurologic control of the bladder; or any combination of the above (Bettez et al., 2012; Holroyd-Leduc, Lyder, & Tannenbaum, 2006; Riss & Kargl, 2011). No matter the type of urinary incontinence, many people consider the topic to be taboo, including women themselves and some health care providers, and this has resulted in approximately 20 unreported cases to every reported case in primary health care (Stewart, 2010). Accurate estimates of how many women suffer from this condition are difficult to determine because this stigma prevents accurate reporting (Canadian Continence Foundation (CCF, 2007)). The World Health Organization (WHO, 2013) lists urinary incontinence as the second of the four giants of geriatrics, along with memory loss, depression, and falls.

Detriments to quality of life caused by this condition range from slight inconvenience to skin breakdown, increased risk of falls and ensuing complications, depression, financial
burden, increased social isolation, loneliness, extreme embarrassment, and even institutionalization (CCF, 2007; Goode, Burgio, Richter, & Markland, 2010). According to a 2009 report by the CCF, urinary incontinence costs Canadians over $7.5 billion annually (p. 11).

The focus of this paper is on stress urinary incontinence in women and the conservative treatment options currently available to treat this condition. Conservative treatment is non-surgical and non-pharmacological (Herbison & Dean, 2013) and includes all treatment modalities that could be carried out by specially trained nurses, physiotherapists, as well as by physicians. Nurses can be, and often are, trained in pelvic floor physiotherapy techniques to fulfill this role. It is hoped that nurses interested in this field of study and practice may find this summary review useful when attempting to sort through the plethora of information related to this topic.

Although stress urinary incontinence does occur in men, some estimate that it is more than four times higher in women (Corcos et al., 2006; Farage et al., 2011; Markland et al., 2011). Known risk factors for stress urinary incontinence include age, obesity, number of pregnancies and vaginal deliveries, menopause and the loss of circulating estrogen, poor diet, and low fluid consumption that leads to dry, hard stools and straining when evacuating the bowels (Abed, & Rogers, 2008; Chong, Khan, & Anger, 2011; & Stewart, 2010).

Many women are still embarrassed or ashamed to talk about this condition with their health care professional even though it poses such widespread problems worldwide (CCF, 2007). It is believed that women often think that there is no effective treatment, that they are the only ones who suffer from it, and/or that it is a natural condition of growing old and having had children, and something for which they must develop coping strategies or suffer
in silence (Cameron, Heidelbaugh, & Jimbo, 2013a; Stewart, 2010). More than half of women with stress urinary incontinence do not seek help for the condition until it reaches proportions that may no longer make it manageable with conservative treatment options (CCF, 2007). It is so common that nearly every woman will experience some degree of urinary incontinence in her lifetime (Riss & Kargl, 2011).

**Review Questions**

The primary question addressed in this literature review is: What conservative treatment options are currently available to treat stress urinary incontinence in women? Secondary questions that arose from the literature review include:

- What are the various benefits, complications and adverse effects of the conservative treatment options identified in the literature?
- What further research could be undertaken to advance knowledge and conservative treatment of stress urinary incontinence in women?
- What role can nurses play in education and treatment of stress urinary incontinence in women?

Three themes arose from the review of the articles selected: the taboo nature of discussing urinary incontinence, how underreporting of the condition leads to underestimating the cost of managing it, and the need for education of the public and health care professionals around the topic of incontinence and strategies for its management.

**Method**
The method chosen to conduct this literature review was the scoping study, or scoping review (Arksey & O’Malley, 2005). Arksey and O’Malley (2005) published a five-stage foundational framework for conducting scoping studies, which was later refined by Levac, Colquhoun, & O’Brien (2010). The five stages of the framework include: identifying the research question, identifying relevant studies, study selection, charting the data, collating, summarizing and reporting the results. They also describe an additional stage that includes a consultation exercise “to inform and validate findings from the main scoping review” (p. 23). However, they stated that this final stage is optional and it was not undertaken in this study.

Scoping studies are designed to define the key ideas underscored in an area of research, as well as the various sources and types of evidence available (Arksey & O’Malley, 2005). Scoping reviews share common features with other literature reviews, such as: the collection of information on a topic of interest, the evaluation of the information or evidence for suitability to the topic, and the presentation of the evidence in a way that supports the topic of interest (Arksey & O’Malley, 2005). While a systematic review of the literature uses a well-defined question to provide specific answers using clear-cut parameters for review, a scoping study can be used when the questions are broad, such as the question under investigation in this paper, and where many different types of literature are examined, including empirical research and grey literature (Davis, Drey, & Gould, 2009). The main purpose of a scoping study is to understand the breadth of literature available on the topic of interest rather than to critique findings, structure, quality and validity of empirical studies (Arksey & O’Malley, 2005; Bish, Kenny, & Nay, 2012; & Levac et al., 2010). Additionally,
a scoping study examines a wide range of evidence and provides a narrative account of interventions (Arksey & O’Malley, 2005; Levac et al., 2010).

In 2010 Levac et al. stated “there is no universal scoping study definition or purpose” (p. 69) that exists. They did not propose any changes to the stages of the original framework, but they identified some challenges and made recommendations for clarification. In the absence of strict guidelines, a combination of the original framework by Arskey and O’Malley (2005) and the refinements proposed by Levac et al. (2010) were utilized to identify the question under investigation, determine the search strategy, select the studies best suited to the investigation, assemble the data from the studies selected, and summarize and report the results, including the implications for nursing practice and recommendations for further research. This scoping study was undertaken with the intent of identifying a collection of relevant literature on the topic of stress urinary incontinence in women and its conservative management, and possibly directing further research on the role of the nurse in the management and treatment of women with this condition.

Search Strategies

A search of general academic databases using the search term ‘stress urinary incontinence’ with no limiters resulted in 42,270 references. In order to manage this large volume of information the search was further limited to the three most popular electronic databases known to house nursing literature: PubMed (Medline), the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Embase (2005 to 2013). Additional limiters to the search were journal articles published in the English language, restricted to females, and with full texts online.
With these parameters in place, the initial search returned 293 articles, plus five published master’s major papers from cIRcle, which is the University of British Columbia’s digital repository of online research and teaching materials, including theses and dissertations. An additional nine published masters and PhD theses were reviewed from ProQuest, which is an online research library database that provides archived information on a variety of subjects, including masters and PhD dissertations (ProQuest, 2014). The total for this search was 307 articles. The key words used for the search were ‘urinary incontinence, stress’ and ‘stress urinary incontinence’ in conjunction with ‘conservative management’, ‘alternative therapy’ or ‘complementary therapy’.

The vaginal pessary was not listed as one of the conservative management options amongst the initial articles, and this author felt that the incontinence pessary is an important conservative treatment option for stress urinary incontinence. Therefore, another search of the same databases with the same limiters was conducted. The single word ‘pessary’ returned 16,344 references, and ‘vaginal pessary’ returned 7,691 references. When the words ‘pessary’ combined with ‘stress urinary incontinence’, ‘urinary incontinence’, or ‘urinary incontinence, stress’ were used, there were 285 references. There were no articles found in either cIRcle or Proquest for pessaries and incontinence. Key words and subject headings were first entered individually and then in combination to maximize the search results. Table 1 summarizes the key words and subject headings used in the search.
<table>
<thead>
<tr>
<th>Database</th>
<th>Search Terms</th>
<th>Limiters</th>
<th>Hits/Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>PubMed (MEDLINE)</td>
<td>‘urinary incontinence, stress’[Mesh] OR ‘stress urinary incontinence’ OR ‘urinary incontinence’ AND ‘conservative management’ OR ‘alternative therapy’ OR ‘complementary therapy’[Mesh]</td>
<td>• Full texts online • English only • Female</td>
<td>119</td>
</tr>
<tr>
<td>CINAHL</td>
<td>“”</td>
<td>“”</td>
<td>78</td>
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<tr>
<td>Embase</td>
<td>“”</td>
<td>“”</td>
<td>96</td>
</tr>
<tr>
<td>cIRcle</td>
<td>Subject: Urinary incontinence</td>
<td>No limits</td>
<td>5</td>
</tr>
<tr>
<td>Proquest</td>
<td>Subject: Urinary incontinence</td>
<td>• Full texts online • English only • Female</td>
<td>9</td>
</tr>
<tr>
<td>PubMed (MEDLINE)</td>
<td>‘pessary’ AND ‘stress urinary incontinence’[Mesh] OR ‘urinary incontinence, stress’</td>
<td>• Full texts online • English only • Female Published after 2004</td>
<td>95</td>
</tr>
<tr>
<td>CINAHL</td>
<td>‘stress urinary incontinence (Saba CCC)’, OR MH ‘stress incontinence’ OR ‘stress urinary incontinence’ AND pessary</td>
<td>“”</td>
<td>1</td>
</tr>
<tr>
<td>Embase</td>
<td>‘stress incontinence’ OR ‘stress urinary incontinence.tw’ AND ‘pessary’</td>
<td>“”</td>
<td>189</td>
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<tr>
<td>cIRcle</td>
<td>Subject: Pessaries</td>
<td>No limits</td>
<td>0</td>
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<tr>
<td>ProQuest</td>
<td>Subject: Pessaries</td>
<td>“”</td>
<td>0</td>
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Once the duplicate articles were removed the total number of articles remaining for stress urinary incontinence was 254, and 227 for pessaries. After the exclusion criteria were applied (Table 2), 146 articles remained for stress urinary incontinence and 108 for pessaries, for a total of 254 articles.

Of these 254 articles, 166 were published in 2004 or before, and they were excluded from the study. The cut-off date of 2004 was selected because the author of this paper published a review of the literature in 2005 that took into account the available information on this topic up to that date (McIntosh, 2005). Eliminating these articles further reduced the pool to 88 articles that were reviewed in depth and retained for this study.
Table 2  *Inclusion and Exclusion Criteria*

<table>
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<th>Inclusion Criteria</th>
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<tr>
<td>Journal articles with full texts online from selected databases</td>
<td>Animal studies</td>
</tr>
<tr>
<td>Masters and PhD theses with full text online from selected databases</td>
<td>Male patient population</td>
</tr>
<tr>
<td>English language</td>
<td>Children patient population</td>
</tr>
<tr>
<td>Female patient population</td>
<td>Surgical repairs (Burch colposuspension, bladder neck needle suspension, stent</td>
</tr>
<tr>
<td>Stress urinary incontinence</td>
<td>insertion, artificial urinary sphincters, tension-free vaginal tape or similar suburethral sling surgeries)</td>
</tr>
<tr>
<td>Conservative management</td>
<td>Medical interventions (stem cell therapy, perineal or transabdominal ultrasound,</td>
</tr>
<tr>
<td>Alternative therapy</td>
<td>transurethral injections of polyacrylamide hydrogel (PAHG))</td>
</tr>
<tr>
<td>Complementary therapy</td>
<td>Pharmacological management</td>
</tr>
<tr>
<td>Vaginal pessaries</td>
<td>Incontinence caused by pregnancy</td>
</tr>
<tr>
<td>Options for patients with stress urinary incontinence after pelvic surgery</td>
<td>Use of pessaries for pelvic organ prolapse</td>
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Figure 1 summarizes the study selection process using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2009 Flow Diagram (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). This diagram outlines the flow of information through the different phases of the review undertaken to select articles for inclusion in this paper.
Figure 1. Summary of the Study Selection Process
Study Selection

Key issues and themes were extracted from each article reviewed and these are included in the data extraction table in the Appendix. In order to ensure consistency, a standardized framework was used to extract information from each article, including: author(s), year of publication, the country of origin of the article or the research, the title of the article, the source of the article and digital object identifier (doi) if available, a brief description of the focus of the article, the primary intervention type, and the conclusions/comments. This information was arranged into an Excel spreadsheet. Every attempt was made to extrapolate the same information from each document, however some documents did not include the required information, making it impossible to do so with 100% consistency.

Summary of Data Collected

The primary focus of each article in the data extraction table was further categorized by the following topics:

DT = Diagnosis and treatment
ES = Electrical stimulation
LI = Lifestyle interventions
MM = Mixed methods (any combination of two or more methods)
PR = Products
PS = Post-surgical treatment options
PT = Physiotherapy and biofeedback
UD = Intraurethral devices
VD = Intravaginal devices
Figure 2 shows the number of articles reviewed by primary focus.

![Bar chart showing the number of articles reviewed by primary focus.]

**Figure 2.** Number of articles reviewed by primary focus (n=88).

Table 3 depicts the country of origin of the articles, or the country in which the research was conducted for the study.
Table 3

*Country of Origin of Article or Country in which Research was Conducted (n=88).*

<table>
<thead>
<tr>
<th>Country/Number of Articles</th>
<th>Country/Number of Articles</th>
<th>Country/Number of Articles</th>
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<td>France – 1</td>
<td>Norway – 2</td>
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<tr>
<td>Austria – 1</td>
<td>Germany – 1</td>
<td>Pakistan – 1</td>
</tr>
<tr>
<td>Brazil – 5</td>
<td>Hong Kong – 2</td>
<td>Spain – 1</td>
</tr>
<tr>
<td>Canada – 9</td>
<td>India – 1</td>
<td>Taiwan – 1</td>
</tr>
<tr>
<td>Canada &amp; New Zealand – 1</td>
<td>Israel – 2</td>
<td>Thailand – 1</td>
</tr>
<tr>
<td>England – 12</td>
<td>Korea – 2</td>
<td>Turkey – 2</td>
</tr>
<tr>
<td>England and New Zealand – 1</td>
<td>New Zealand – 1</td>
<td>USA – 39</td>
</tr>
</tbody>
</table>

Figure 3 depicts the type of article reviewed.

![Type of Article Reviewed](chart.png)

*Figure 3. Type of Article Reviewed (n=88).*
Preview of the Next Chapters

In Chapter Two the following topics are presented and discussed: the historical perspective on urinary incontinence, the anatomy and physiology of the continence mechanism, the differences between stress urinary incontinence and other types of incontinence, the prevalence and incidence rates, the risk factors for developing urinary incontinence, the methods of diagnosis and testing, the consequences of urinary incontinence, and the considerations of the patient’s goals for treatment. In Chapter Three the conservative treatment options identified in the literature are described. In Chapter Four the secondary review question of the various benefits, complications and adverse effects of the conservative treatment options identified in the literature are addressed. Chapter Five is a discussion of the three themes that arose from the review of the articles selected: the taboo nature of discussing urinary incontinence, how underreporting of the condition leads to underestimating the cost of managing it, and the need for education of the public and health care professionals around the topic of incontinence and strategies for its management. Finally, in Chapter Six, the review closes with a discussion of the two final secondary review questions, including: suggestions for possible further research, and the implications for nursing practice.
Chapter Two

Historical Perspective on Urinary Incontinence

In 1947 Evelyn Pearce wrote a nursing textbook entitled *A General Textbook of Nursing*, and included a small section on the disorders of micturition including: frequency, incontinence, enuresis, retention, and dysuria. She did not make any recommendations for nursing management of either frequency or incontinence, but did have some very brief suggestions for the conservative management of enuresis, urine retention, and dysuria, some of which are still used today. At the time the book was written, nursing educators may have thought that the management of incontinence was outside the realm of nursing care. Additionally they may have also believed that urinary incontinence was a normal part of being a woman, or that the topic was considered too taboo to discuss, even in a nursing textbook.

In contrast to the nursing teaching of that time, some practicing obstetricians were beginning to become very interested in discussing, diagnosing, and trying to manage urinary incontinence. In the late 1940s and early 1950s, Dr. Arnold H. Kegel began publishing his groundbreaking articles describing how women could regenerate the function of the muscles of the birth canal following childbirth. Although he argued that the organs and tissues of the urethra, cervix, vagina, and perineum would never regain their “original integrity of form and function” after the delivery of a baby (Kegel, 1948, p. 238), he postulated that the best way for the muscles of the pelvic floor to regain their former function was for them to be exercised. According to Kegel (1951), stress urinary incontinence occurred when “voluntary muscles in the region of the vesical neck show evidence of loss of function and atrophy, often simulating a degree of paralysis” (p. 915). The condition, he stated, was amenable to
correction “in all women” through “re-education of muscular function and resistive exercises that could be instituted as a “simple office procedure” (p. 915). He noted that a colleague had observed that women in one South African tribe had unusually firm perineal muscles following childbirth. Within this tribe “it was the duty of the midwife…to see that the young woman recovered perineal strength after childbirth. Exercise by contraction of vaginal muscles on distended [extended] fingers was begun several days after birth and was continued periodically for several weeks, until the desired result was obtained” (Kegel, 1948, p. 241).

Over a period of 14 years, and after conducting thousands of examinations of muscular function in the area of the pelvic outlet, Dr. Kegel concluded that a woman’s ability to voluntarily contract the muscles of the pelvic floor strongly correlated with the presence or absence of stress urinary incontinence. His simple office procedure included observation, palpation, and the measurement of contractile strength. To determine tone and strength of perineal muscles and duration of muscle contraction, he advised physicians to place one finger in the woman’s vagina and ask the woman to draw in and up while contracting the perineal muscles as if to stop a bowel movement or the flow of urine. By performing this office procedure physicians could determine the strength of perineal muscle force, detect the tone of the muscles, and measure the time that the woman could hold the contraction without losing effectiveness. Kegel (1948) stated that if physicians taught women to contract muscles in the region of the pubococcygeal muscle that were already under conscious control, the women could then be encouraged to repeat this activity frequently over a period of weeks or months until the strength and duration of the contractions increased. To assist women in performing these exercises at home, he created a
device that he called a “Perineometer” (Figure 4). This device measured muscle contractions of the perineum and provided visual feedback (by means of a calibrated manometer) to the woman of the degree of effort exerted as well as the duration of the contraction. He stated that this device was “useful in restoring function and tone in the immediate postpartum period, improving early cystocele and rectocele during the childbearing years, improving the vaginal muscles so that a contraceptive diaphragm may be retained, and relieving urinary stress incontinence” (Kegel, 1948, p. 248).

Figure 4. Perineometer used by Arnold H. Kegel in 1948 to measure the force of perineal muscle contractions. (Diagram used with permission from Elsevier.)

Since that time, countless authors have described how performing pelvic muscle exercises, known as Kegel exercises, either assisted with physiotherapy, or performed voluntarily and repeatedly, could strengthen the pelvic floor musculature (Abed & Rogers, 2008; Cameron et al., 2013a; Demirturk et al., 2008; Madill, 2009; Santacreu & Fernandez-Ballesteros, 2011).
Incontinence, however, was not formally classified as a disease until 1998, when the World Health Organization (WHO) hosted The First International Consultation on Incontinence (ICI). The aim of this conference was to raise world consciousness of the symptoms and consequences of urinary incontinence and find ways to prevent and treat the condition.

**Anatomy and Physiology**

During any activity in which pressure increases in the abdominal cavity, this pressure is transferred to the bladder and its stored urine [intravesicular pressure]. There is also pressure within the resting urethra that maintains its closure during the filling of the bladder. If the intravesicular pressure exceeds the urethral pressure, urine will be able to escape, and the woman will be incontinent (Rigby, 2005; Yip, 2011). To maintain continence, either the closure pressure of the urethra must exceed the intravesicular pressure, or the pelvic floor must be able to tighten around the urethra to maintain closure.

There are two well-known theories of continence: the integral theory and the hammock theory. Common to both theories, the mobility of the urethra appears to be the determining factor in maintaining continence.

The integral theory proposes that the elastic and muscular properties of the vagina act both as anchoring and lengthening mechanisms for the urethra. Together these mechanisms help a woman maintain continence (Komesu, Ketai, Rogers, Eberhardt, & Pohl, 2008).

According to the hammock theory of continence, the musculature of the pelvic floor forms a hammock through which the urethra, vagina and rectum pass (Goncalves, 2005; Rigby, 2005; Yip, 2011). It is the strength of this hammock that supports and reduces mobility of the urethra (Komesu et al., 2008).
When intra-abdominal pressure rises, as during coughing, sneezing or straining, the pelvic floor tightens to provide support to the internal pelvic structures, or it relaxes and stretches, as during childbirth. Extended labor, tearing, and the use of episiotomies compromise the integrity of the pelvic floor muscles and this can lead to later problems with urethral hypermobility and incontinence (Yip, 2011).

The bladder itself is made up of several layers of muscle, the thickest of which is called the detrusor muscle (CCF, 2012). In order for the bladder to function properly a series of complex neurological mechanisms have to be working in synchronicity. As the bladder fills, it enlarges due to its many folds, or rugae, which allow it to expand. The internal and external sphincters of the urethra remain closed as it fills to an average capacity of 350 to 600 milliliters (Abed & Rogers, 2008; Komesu et al., 2008). Once the bladder sends a signal to the brain that it is time to void, the internal sphincter relaxes to allow the urine to flow out. If the time and place for micturition is not appropriate, the external sphincter, with the help of contractions of the muscles of the pelvic floor, will remain closed to prevent leakage of urine until the person can find a suitable place to empty their bladder (Demirturk et al., 2008; Grewar & McLean, 2008; Griebling, 2009; Karon, 2009; Peschers & DeLancey, 2008).

**Differentiating Stress Urinary Incontinence from Other Types of Urinary Incontinence**

Many women will unsuccessfully attempt self-management for incontinence using pads or other containment products (Farrell, Baydock, Amir & Fanning, 2007). Women may not be aware that there are several distinct types of incontinence, and that each type can have a variety of causes and treatments. Each should be diagnosed and treated differently by
health care professionals, as long as the health professional understand the differences and the different treatment options:

- Stress incontinence (divided into three subtypes: primary, secondary, and occult)
- Urge incontinence (also known as overactive bladder or detrusor instability)
- Mixed incontinence
- Overflow incontinence
- Functional incontinence
- Structural incontinence
- Nocturnal incontinence (nocturnal enuresis)

**Stress Incontinence**

Stress incontinence includes three types: primary, secondary, and occult. Primary stress urinary incontinence is generally considered to be the most common type in women (Brown et al., 2006; Burgio & Goode, 2008; CCF, 2012; Cornu et al., 2012; Farange et al., 2011; Kim, Nam, Park, Lee, & Kim, 2008; Kirby, 2006; Madill, 2009; Riss & Kargl, 2011; Stewart, 2010; Yip, 2011).

Primary stress incontinence occurs as a result of the woman’s inability to stop a leak when external abdominal pressure is applied to the bladder. External pressure can result from many sources, including coughing, sneezing, laughing, straining, and/or exercising (CCF, 2007; Rigby, 2005). This type of incontinence is diagnosed through urodynamic testing in which the bladder is filled to capacity (with either sterile water or a sterile saline solution) by means of a catheter inserted though the urethra. The woman is then asked to cough, laugh or bear down, thereby applying external pressure to the bladder without the accompanying
contraction of the bladder [which would be present in urge incontinence] (Riss & Kargl, 2011). The reaction of the bladder to this filling with water is recorded by cystometry, which “measures the bladder’s ability to retain urine at different capacities and pressures” (Rigby, 2005, p. 47). Any leakage of urine observed during cystometry is called urodynamic stress incontinence (Noblett, McKinney, & Lane, 2008; Stewart, 2010).

Secondary stress incontinence occurs as a result of conditions that do not relate directly to the anatomy of the urinary system, and may or may not be reversible or at least manageable. Examples of conditions that can lead to secondary stress incontinence are: urinary tract infections, the use of diuretics, diabetes mellitus, or excess fluid consumption (Markland et al., 2011). Other conditions that could result in secondary stress incontinence include acute confusion, delirium, minimal mobility or cognitive decline as in advancing dementia or Alzheimer’s disease (Bettez et al., 2012; Taylor, Weir, Cahill, & Rizk, 2013). In these individuals, incontinence is secondary to the underlying health condition.

Occult, or de novo, stress incontinence occurs when a woman’s prolapsed bladder is returned to its normal anatomical position either through surgery or with the use of a vaginal pessary (Reena, Kekre & Kekre, 2007). Figure 5 shows how an otherwise continent woman becomes incontinent when the bladder is elevated and the urethra has been straightened back to its normal anatomical position. “Women with severe genitourinary prolapse may be continent in spite of a weak urethral sphincter, as the kinking effect of the prolapsed bladder on the urethra can cause urethral occlusion and increase the intraurethral pressure” (Reena et al., 2007, p. 31).
a) Normal anatomical position of the bladder       b) Bladder prolapse (cystocele)

Figure 5. Normal anatomical bladder position (a), and prolapsed bladder (cystocele) (b) resulting in a kink in the urethra that prevents urine leakage. (Diagrams used with the permission of Dr. S. Goldwasser - [http://bladderdoc.com/condition/pelvic_organs](http://bladderdoc.com/condition/pelvic_organs))

**Urge Incontinence**

Urge incontinence, also known as overactive bladder or detrusor instability, occurs as a result of a strong sensation of the need to urinate that cannot be controlled by using the closure mechanism of the external urinary sphincter and the pelvic floor muscles to block the urge until it passes, and prevent the leakage of urine. It is the second most common reason for incontinence in women after stress incontinence and the main cause of urinary incontinence in the elderly (CCF, 2007; Gamble & Sand, 2007).

**Mixed Incontinence**

Mixed urinary incontinence occurs when the symptoms of both urge incontinence and stress incontinence are present (Riss & Kargl, 2011). In other words, the woman suffers from both urge incontinence and stress incontinence, and a strong urge to urinate may overcome the woman’s ability to prevent a leak.
Overflow Incontinence

Overflow incontinence occurs as a result of loss of urine when the bladder is full to capacity, and results in constant leaking or dribbling of urine (CCF, 2007; Gamble & Sand, 2007; Griebling, 2009). An over-distended bladder may result from urethral stenosis or other urethral obstruction such as a tumor, pressure from chronic constipation, or pelvic organ prolapse. The bladder can also overfill because it is hypoactive or not reactive to rising intravesicular pressure (Griebling, 2009). A hypoactive bladder can result from a congenital defect, post-spinal surgery, medications, pain, and/or anxiety (Hanzaree & Steggall, 2010).

Functional Incontinence

Functional stress incontinence, also called “transient incontinence” (Griebling, 2009, p. 446) results from causes outside the urinary system, or as a result of temporary conditions that alter the person’s ability to maintain continence. Examples of this include: altered or restricted mobility such as after a fall, loss of dexterity of the hands such as in arthritis, the use of a new diuretic medication, urinary tract infections, atrophic vaginitis, stool impaction, depression, and changes in cognition, such as in delirium (Griebling, 2009; Pastore, Kightlinger, & Hullfish, 2007). In many cases individuals who otherwise have no incontinence experience incontinence as a result of limitations that make it difficult or impossible for them to get to the toilet in time, inaccessible bathroom designs, and/or difficulty removing clothing quickly enough (CCF, 2007; Gamble & Sand, 2007; Hanzaree & Steggall, 2010; Holroyd-Leduc et al., 2006). If this incontinence is as a result of external pressure on the bladder, then it is secondary stress urinary incontinence, as described above.
Structural Incontinence

Structural incontinence can be caused by any anatomical irregularity or abnormality in the urinary system. An example of this occurs when urine leaks from the vagina. This type of incontinence may be secondary to a surgical error occurring during pelvic surgery, as a result of a birth defect, or when a fistula develops between the bladder and vagina or between the urethra and vagina (Bettez et al., 2012; Bradley et al., 2005; Cameron et al., 2013a; Herbruck, 2008; Pastore et al., 2007; Schultheiss, 2009).

Another form of structural incontinence occurs when weakened pelvic floor muscles allow the urethra to become extremely mobile within the pelvic floor musculature, which then leads to failure of the urethra to close properly. This is called urethral hypermobility (Komesu et al., 2008; Noblett et al., 2008; Rigby, 2005).

Finally, structural changes caused by the loss of elasticity of the sphincters of the urethra (due to injury, age, or declining estrogen levels) can result in changes in the position of the urethra and incomplete urethral closure when external pressure is applied. This is called intrinsic sphincter deficiency (Appell & Davila, 2007; Rigby, 2005; Criner, 2006).

The pelvic floor musculature is a complex system of striated and skeletal muscles, ligaments, and nerves (Goncalves, 2005; Elneil, 2009). Damage to this musculature is seldom caused by one event (Elneil, 2009; Madill, 2009) and often damage or trauma to one pelvic organ is also experienced, at least in part, by other pelvic organs, leading to a complex change in the ability of the pelvic floor to maintain the integrity of the internal organs. As a result, whatever caused the damage to one organ, such as the bladder, may also cause damage to the vagina, the uterus and/or the rectum (Elneil, 2009).
STRESS URINARY INCONTINENCE MANAGEMENT

Nocturnal Incontinence

Nocturnal enuresis implies that the bladder completely empties during sleep, which is not always the case; therefore the term *nocturnal incontinence* is sometimes used to describe this condition in adults (Swithinbank et al., 2000). Nocturnal incontinence (nocturnal enuresis) occurs during sleep. It is most commonly seen in children [primary nocturnal enuresis] who are past the age of toilet training, but it may also occur in adults who are not aware of the urge to urinate at night (CCF, 2007; CCF, 2012). This condition has been studied extensively in children, but its presence in adults is not well understood; it is thought to be as a result of many factors including “heredity, detrusor instability, failure to awaken from sleep and/or loss of the antidiuretic hormone diurnal rhythm” (Swithinbank et al., 2000, p. 764). As people age the storage capacity of the bladder decreases and, since “the majority of urine production occurs nocturnally”, there is a greater need to urinate at night (Burgio & Goode, 2008, p. 37).

Prevalence and Incidence of Urinary Incontinence

It is difficult to quantify the prevalence of the different types of urinary incontinence because health care providers and women use varying definitions and descriptors for urinary incontinence (Srikrishna & Cardozo, 2012). The perceived social stigma associated with urinary incontinence (including embarrassment and psychological distress) also preclude accurate disease surveillance and statistical interpretations (CCF, 2007; Gamble & Sand, 2007)

Despite epidemiological difficulties, researchers have estimated that the prevalence of all types of incontinence in women in Canada is 17.3%, and in men, 3.4% (Corcos et al., 2006). Kirby (2006) stated that since “many sufferers are too embarrassed to present with
their symptoms, the actual figure is likely to be far higher” (p. 184). Sufferers often find it difficult to lead normal lives due to their fear of urine leakage and the accompanying embarrassment it causes. Of the women who suffer from incontinence, approximately 50% of all cases are as a result of stress incontinence, 32% are from mixed incontinence, 14% are from urge incontinence, and the remaining 4% are from other forms of incontinence, including overflow, functional, structural and nocturnal (CCF, 2010).

Many women attempt self-management, especially when the symptoms are first noted. This is due to embarrassment, a belief that they may be the only sufferers, a belief that it is a normal part of being a woman or of growing older, and/or a belief that nothing can be done about it (Goode et al., 2010; Maddill, 2009). Kirby (2006) reported that 25% of women wait more than 5 years before seeking professional help for symptoms of stress urinary incontinence. Additionally, studies have shown that many women do not understand the meaning of the word “incontinence” and therefore the condition is often not reported (Clark, 2008; Taylor et al., 2013).

The incidence of urinary incontinence of all types increases with the number of vaginal births a women has had, with advancing age, weakening of the bladder and pelvic floor muscles, loss of estrogen following menopause, and with medical co-morbidities such as diabetes or chronic coughing (CCF, 2012; Rigby, 2005; Taylor et al., 2013). According to Pastore et al. (2007), African-American women suffer less incontinence than Caucasian women. They also stated that Hispanic women and women with diabetes run twice the risk of incontinence than other women.

In Canada, reported female urinary incontinence per capita was greatest in Saskatchewan (5.27%), followed by PEI (4.87%), Manitoba (4.69%) and British Columbia
(4.51%). Yukon, NWT and Nunavut (2.58%) reported the least urinary incontinence in the female population per capita (CCF, 2007, p. 8). The CCF (2007) also reported that the prevalence of urinary incontinence increased with increasing age with the largest increase in women after the age of 54.

**Risk Factors for Urinary Incontinence**

In addition to the incidence of urinary incontinence being dependent on a combination of age, race, hormonal status, obesity, and history of pregnancy and childbirth (Abed & Rogers, 2008) there are other factors that put a woman at risk for developing incontinence. Injury to pelvic floor musculature is most prevalent following vaginal delivery (Yip, 2011). Additionally, pelvic organ prolapse, constipation, straining to pass stools, chronic coughing, alcohol use, neurologic dysfunction, the use of diuretics and narcotics, previous pelvic surgery such as a hysterectomy, and genetic predisposition are other primary causes of urinary incontinence (Appell & Davila, 2007; Elneil, 2009; Kirby, 2006; Pastore et al., 2007). The use of diuretics can result in polyuria, frequency and urgency; narcotic analgesics can result in urinary retention, fecal impaction, and sedation; alcohol can result in polyuria, frequency, urgency, sedation, and immobility; caffeine can result in polyuria and bladder irritation. Factors that lead to incontinence such as stool impaction, smoking, obesity, urinary tract infections, and delirium are all reversible (Bettez et al., 2012; Gamble & Sand, 2007; Rigby, 2005) when the underlying condition or aggravating factors are removed (Gamble & Sand, 2007).

**Diagnostics**

Women may be undergoing treatment by a number of different specialists for various urogynecological problems, and may not perceive that urinary incontinence and pelvic organ
prolapse are related (Buchsbaum, 2006). At routine office visits, health care providers should make a point of asking all women if they suffer any of the symptoms of urinary incontinence (Herbruck, 2008; McIntosh, 2005). Simply taking a woman’s history seldom provides an accurate diagnosis because women who present with complaints of stress urinary incontinence are often found to have mixed incontinence (Chittacharoen, 2005; Gamble & Sand, 2007). These authors suggest that the diagnosis should be made only after completing a detailed history (including the use of questionnaires when appropriate), physical examination, and testing.

**History**

The woman’s history should include questions about surgical, medical and obstetrical interventions, current medications, cognitive and neurological impairment including physical dexterity and mobility (Abed & Rogers, 2008). She should also be asked to provide information about any co-morbidities such as diabetes and obesity, lifestyle practices such as fluid consumption, smoking or alcohol use, as well as past attempts at controlling the problem of incontinence by surgical or conservative means (Abed & Rogers, 2008; Bettez et al., 2012; Gamble & Sand, 2007; Rigby, 2005). Additionally, to facilitate the diagnosis, the history should include a review of voiding symptoms, the type and degree of detriments to quality of life, the review of a voiding diary, and the determination of any transient causes of incontinence (Abed & Rogers, 2008; Borello-France, Zyczynski, Downey, Rause, & Wister, 2006; Herbruck, 2008). There are several screening questionnaires that clinicians can use to gather information about urinary incontinence to differentiate between the various types (Abed & Rogers, 2008; Bradley et al., 2005; Bradley et al., 2010; Brown et al, 2006).
Physical Examination and Other Testing

Physical examination should include: a pelvic examination to determine normal sensation, pelvic floor strength, pelvic organ prolapse, bladder storage capacity (350-600 milliliters), and urethral hypermobility (Bettez et al., 2012; Rigby, 2005). Some clinicians use a pad test, which measures the weight of incontinence pads before and after use while performing random activities. A pad test would be positive if more than 1 gram of urine was lost per hour (Gamble & Sand, 2007; Herbruck, 2008; Rigby, 2005). Additionally, a cough stress test can be used, which is simply asking the client to cough or strain with a full bladder to see if there is any urine leakage. A cough stress test can also be performed to diagnose urethral hypermobility: using a well lubricated Q-tip inserted into the urethral orifice and asking the woman to cough and bear down (strain) will confirm this diagnosis if the Q-tip moves more than 30 degrees from its stationary position (Gamble & Sand, 2007; Herbruck, 2008; Noblett et al., 2008). Additional non-invasive or minimally invasive techniques that could be used to determine cause include voiding diaries, exclusion of urinary tract infections as the cause, especially if the incontinence is transient, and measuring post-void residuals with the use of a hand-held bladder ultrasound device or with in-and-out catheterization (Abed & Rogers, 2008; Herbruck, 2008; Pastore et al., 2007).

More invasive tests to determine cause of incontinence include cystometry (measuring the bladder pressure as it fills); uroflowmetry (measuring the speed and pressure of urine flow in milliliters per second); and urodynamic evaluation, which measures “involuntary urine leaks during increased abdominal pressure but with no contraction of the detrusor muscle” (Chang, Wong, Wong, Leung, & Chung, 2011, p. 1140; Dumoulin & Hay-Smith, 2008). Urodynamic testing must be performed by a trained nurse or physician in a
urodynamic laboratory (Rigby, 2005). Finally, videocystourethrography involves the use of
cystometry with radiographic dye and a video camera attached to a cystoscope that is
inserted through the urethra to observe the changes in the bladder, the bladder neck, and the
urethra as the bladder fills (Burgio & Goode, 2008).

**Consequences of Urinary Incontinence**

Urinary incontinence can have far-reaching effects on the individuals who suffer
from it, on caregivers, on healthcare workers, and on society in general (CCF, 2007). For the
sufferer, it can have profound negative effects on physical, psychological, social, sexual,
financial, and quality of life. For caregivers it can interfere with their abilities to remain
employed outside the home. For healthcare workers it takes time and energy away from
their other duties. For society the cost of managing incontinence is prohibitive (CCF, 2007).

**Quality of Life, Physical, Psychological and Social Implications**

The adverse effects of urinary incontinence on women’s quality of life have been
studied and documented by many (Bettez et al., 2012; Goode et al., 2010; Srikrishna &
Cardozo, 2012). In 1998, the World Health Organization defined quality of life (QoL) as the
“individual’s perceptions of their position in life in the context of the culture and value
systems in which they live and in relation to their goals, expectations, standards and
concerns” (WHOQOL Group, 1998, p. 551). This definition is still valid today because it
implies that quality of life is a subjective interpretation by the individual of what constitutes
fulfillment of societal and personal goals in the times in which they live.

Quality of life will mean different things to different people living in different times
and in different cultures. There have been many advances in medicine and public health
since the WHO defined QoL that have improved morbidity and mortality from disease and
illness. Today more emphasis is being placed on improving the quality of life for sufferers of many chronic conditions, including urinary incontinence. If quality of life in one area diminishes, it has an impact on many other areas of health. For example, if a woman begins to curtail her activities as a result of urinary incontinence, this may have an impact on other areas of her life that are also important to her health, such as social status, social support networks, social environments, and personal health practices and coping skills.

Goode et al. (2010) estimated that the impact of urinary incontinence on quality of life is so great that it even exceeds that of diabetes, stroke, and some forms of arthritis. In one study reported by the CCF (2007) women were willing to pay as much for a cure for incontinence as they would be willing to pay for even “partial relief of other chronic medical conditions like migraine headaches or gastroesophageal reflux” (p. 18). Not only does urinary incontinence have a profound impact on quality of life, it is a “key factor in admission of elderly to long-term care facilities” (Gamble & Sand, 2007, p. 433) that also carries significant economic burden (Bettez et al., 2012; CCF, 2007; Castro et al., 2008; Chong et al., 2011; Hu & Wagner, 2005; Santacreu & Fernandez-Ballesteros, 2011).

Physical implications of urinary incontinence include: skin irritation, breakdown and/or decubitus ulcers, recurrent urinary tract infections, increased risk for falls and fractures, and sleep disruption (CCF, 2007). These can “signal loss of independence as well as reduced quality of life” (Gamble & Sand, 2007, p. 433). Social implications for women with urinary incontinence include restriction of activities for fear of an incontinence episode, and this can lead to a downward spiral of depression, dependency, increased caregiver burden, social isolation, and limited physical fitness, which brings with it additional health problems (CCF, 2007; Clark, 2008; Demirturk et al., 2008; Gamble & Sand, 2007;
Griebling, 2009).

**Sexual Implications**

Stress urinary incontinence has been shown to negatively impact a woman’s self-perception, emotional and psychological wellbeing, and sexual relationships (Katz, 2009; Kenton et al., 2012). Katz (2009) states “there is good evidence that the effects of urinary incontinence on sexual functioning are similar regardless of whether the incontinence is categorized as stress, urge, or mixed” (p. 59). Urinary incontinence during sexual activity can occur as a result of “clitoral stimulation, vaginal penetration, abdominal pressure, or orgasm” (Katz, 2009, p. 59) and can lead to “loss of libido, altered arousal or lubrication, changes in orgasm, diminished satisfaction, and less commonly, pain with intercourse” (p. 59), not to mention embarrassment.

**Financial Implications**

Urinary incontinence is “an embarrassing and debilitating symptom that is becoming a major health concern for women of all ages with significant public health and economic consequences” (Taylor et al., 2013, p. 97). Loss of productivity, the cost of products and laundry, surgeries, and incontinence devices all combine to add to the significant financial burden of incontinence (Gamble & Sand, 2007). The direct cost to individuals living at home with incontinence can range from $1000 to $1500 per year on incontinence products and extra laundry costs. Currently the cost of one small incontinence panty liner is approximately $0.13 CAD and a large full incontinence brief is approximately $1.06 CAD. While this may not seem like much to pay for an incontinent product, when these numbers are multiplied by the use of several products a day for months or years, the cost can become prohibitive, especially for seniors on fixed incomes or low-income individuals.
In long-term care facilities the cost increases to $3000 to $10,000 CAD per person as a result of increased staff time to change linen and clothing, the cost of supplies, and laundry costs (CCF, 2007). Society is paying upwards of $1 billion per year in Canada as a result of the direct cost of urinary incontinence. The indirect costs are difficult to measure but it is estimated to be upwards of $2.6 billion per year when “loss of productivity, absenteeism, and individual, familial, and societal impacts” (CCF, 2007, p. 2) are considered together.

**Considerations of the Patient’s Goals for Treatment**

According to Srikrishna and Cardozo (2012), consideration of the patient’s goals for treatment was first introduced in community mental health in the 1960’s through the use of goal attainment scaling (GAS). This has since been used in other areas of health care, such as in measuring treatment outcomes as a result of interventions, but it has not been widely utilized to measure symptom relief for urinary incontinence interventions. Quality of life (QoL) questionnaires have been developed to capture patient preferences in expectations, the setting of goals, the attainment of goals, and satisfaction with treatments and outcomes (Kenton et al., 2012). Srikrishna & Cardozo (2012) stress that women seek treatment in order to reach a personal goal. Clinicians have to inquire what the patient’s personal goals are and plan with the woman the best interventions to achieve those goals.

In one study reported by Elser (2012), women were asked about their goals for urinary incontinence treatment and were given a list of possible treatment options. The majority of women in the study opted for treatments that were convenient and safe even if they were not shown to be as effective as treatments that posed more risk to future health, such as surgery. Treatment should start with simple lifestyle modifications because women
can easily assess their response to these interventions. Positive outcomes, no matter how small, may motive women to continue with the treatment (Dwyer & Kreder, 2005).
Chapter Three

Conservative Treatment Options Identified in the Literature

Just as there are many different types of urinary incontinence, there are numerous treatment options ranging from surgical procedures, to absorbent products, physical therapy, vaginal and urethral inserts, and medications (Ziv, Stanton, & Abarbanel, 2008). The choice of options varies depending on the diagnosis of stress incontinence, urge incontinence, or a combination of the two, mixed incontinence. Stress and urge incontinence often occur at the same time, therefore strategies to prevent the development of one or the other in the first place should be put into place early.

Strategies include screening all women for the initial symptoms of urinary incontinence, removing the social taboos surrounding discussing the condition, and providing a variety of options for women to manage the condition before resorting to surgical interventions (Dwyer & Kreder, 2005; Rigby, 2005). This chapter will focus on describing conservative options for stress urinary incontinence. Multiple conservative treatment options were identified in the literature (Table 4). Each of these options will be described in more detail in the following paragraphs.
Table 4

Conservative Therapies Identified in the Literature for the Treatment of Stress Urinary Incontinence in Women

<table>
<thead>
<tr>
<th>Treatment option</th>
<th>Specific Interventions</th>
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<tbody>
<tr>
<td>Strengthening pelvic floor muscles</td>
<td>Pelvic floor muscle training</td>
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<td>Biofeedback</td>
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<td>Circular muscle training (Paula Method)</td>
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<td>Electrical muscle stimulation</td>
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<td>Electromyography and EMG electrodes</td>
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<td>Interferential therapy</td>
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<td>Intravaginal support devices</td>
<td>Incontinence pessaries</td>
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<td>Bladder neck support prostheses</td>
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<td>Weighted vaginal cones</td>
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**Strengthening the Pelvic Floor Muscles**

*Pelvic floor muscle training.* The rationale for pelvic floor muscle training is that a strong and fast pelvic floor muscle contraction will clamp the urethra, resulting in an
increase in urethral pressure to prevent leakage during an abrupt increase in intra-abdominal pressure, such as jumping on a trampoline or when making a sudden movement. Performing pelvic floor exercises is often at the top of the list of conservative treatment options for women with stress urinary incontinence, and they are often recommended as the first line of treatment (Bo, 2012; Bray et al., 2007; Donahoe-Fillmore et al., 2011; Huebner et al., 2011).

The first physician to describe how to perform these exercises was Dr. Arnold Kegel (Kegel, 1948). He was interested in interventions aimed at conserving and restoring skeletal muscle function, and stated that, “modern concepts of muscle-cell regeneration reveal that birth-canal musculature is especially responsive to an improved method of conserving and restoring function” (Kegel, 1948, p. 238). He described the specific process for restoring the damaged muscles of the perineum following childbirth as the opposite of what had been prescribed in the past, which was relaxation and passive exercise. He prescribed active exercise with a focus on “drawing in the perineum” (p. 242) and he recommended that to restore “tone and function to lax perineal muscles require[d] from twenty to forty hours of progressive resistance exercise, spread over twenty to sixty days” (p. 245). The contraction and relaxation of the pelvic floor musculature, with the intent of strengthening the support of the bladder, urethra and vagina, became known in the literature as Kegel exercises.

Since that time, a great deal of research and study has been done with various forms of the exercise. One author stated that there is now evidence to show that contracting the transverse abdominus muscles at the same time as the pelvic floor muscles can increase the effectiveness of performing Kegel exercise in isolation (Clark, 2008).

**Biofeedback.** Biofeedback involves providing visual or auditory feedback to the patient when she voluntary performs a muscle contraction. A surface electrode is placed in
the patient’s vagina, rectum, or on the surface of the perineum (Capelini et al., 2006; Karon, 2009; Price, Dawood, & Jackson, 2010). When the patient performs a contraction she is then alerted as to whether she used the correct muscles, and she is also provided with information about the strength and duration of the contraction.

**Circular muscle training (Paula Method).** This method is named after Paula Garbourg, the method’s originator. It is based on the theory that all the sphincters in the body work together and can affect one another (Liebergall-Wischnitzer et al., 2009). The Paula Method is the contraction and relaxation of specific ring muscles in areas of the body other than the pelvic floor. According to the theory, levator ani muscle weakness resulting in stress urinary incontinence can be improved by exercising ring muscles of the eye, mouth, nose, and others (Liebergall-Wischnitzer et al., 2009). Contracting the pubococcygeal muscles or the anal sphincter, opening and closing the eyelid and/or the mouth, and pressing each finger of both hands to the thumbs and holding, are all examples of this method (Kwon, Kim, Son, Roh, & You, 2010; Liebergall-Wischnitzer et al., 2009).

**Electromyography and EMG electrodes.** Electromyography is the study of the electrical activity of muscles, and it has proven useful in teaching patients the correct way to perform pelvic floor exercises. The advantage to this type of treatment is that it provides the patient with both visual and auditory feedback on the quality and strength of pelvic floor exercises (Rett, Simoes, Hermann, Pinto, Marques, & Morais, 2007; Rigby, 2005). The procedure involves the insertion of an intravaginal sensor and an abdominal surface electrode that connect to biofeedback equipment. There is no electrical stimulation of the muscles of the pelvic floor in this method, only feedback on the quality, strength and duration of pelvic floor muscle contractions. Women use these devices while contracting their pelvic floor
muscles and at the same time keeping the abdominal muscles relaxed. The equipment lets
the woman know immediately if she is contracting the correct muscles or if she is using
accessory muscles (Borello-France et al., 2013; Huebner et al., 2011; Madill, 2009; Rett et
al., 2007).

**Functional electrical stimulation (FES) and functional magnetic stimulation**
(FMS). Bolukbas, Vural, Karan, Yalcin, and Eskiyurt (2005) described electrical muscle
stimulation (EMS) as “a passive treatment modality” (p. 298) and stated, “stimulation of the
pudendal nerve by electrical impulses in low frequency causes contraction of the levator ani
and activation of the inhibitory bladder reflex” (p. 300). Stewart (2010), and Bower (2008),
both suggested that neuromuscular electrical stimulation machines (NMES) could be loaned
to patients who would simply insert a battery-operated probe into their vagina and carry on
with ordinary activities, letting the machine do all the work. Electrical stimulation is used to
inhibit the voiding reflex and contract pelvic floor muscles (Burgio & Goode, 2008;
Herbruck, 2008). Through the application of vaginal, rectal or surface electrodes, an
electrical current can be delivered to the muscles of the pelvic floor causing contraction and
increasing urethral closure pressure (Karon, 2009).

Both FES and FMS are passive electrical stimulation treatment modalities (Bolukbas
et al., 2005; Mathur, Browning, & Mistri, 2010). FES involves the insertion of a wand-type
device into the patient’s vagina that has stimulating electrodes along the shaft. High
frequency pulses are then used to stimulate pelvic muscle contractions (Castro et al., 2008;
Herbison & Dean, 2013; Mathur et al., 2010). FMS involves participants sitting on a
specially designed seat that has a magnetic coil embedded in it. When the woman sits with
her perineum centered on the coil, the coil stimulates the vaginal and anal sphincters to
contract by means of a magnetic flux (Bolukbas et al., 2005).

**Interferential therapy.** Interferential therapy (also called interferential current) is a form of electrical stimulation that “aims to improve the urethral closure pressure by restoration of reflex activation of the pelvic floor muscles, maintaining synchronised contraction of these muscles in addition to the strengthening effect” (Demirturk et al., 2008, p. 318). In this therapy, two to four electrodes are applied externally and the electrical frequencies intersect in the pelvic floor causing stimulation of the pelvic floor muscles (Demirturk et al., 2008). According to Vodusek and Laycock (2008) this type of therapy is patient-controlled with the patient adjusting the strength of the stimulation to just below the level of discomfort. They stated that the therapy has been used with “encouraging results and without any serious side effects” (p. 124).

**Intravaginal Support Devices**

Intravaginal support devices used to treat stress urinary incontinence include pessaries, bladder neck support prostheses, weighted vaginal cones, and pelvic floor exercisers (Anders & Bidmead, 2005; Rigby, 2005). Some are disposable devices but many are reusable. These devices are designed to support the urethra and reduce or prevent leakage when intra-abdominal pressure increases (Karon, 2009).

**Incontinence pessaries.** Many authors have written about the benefits of using incontinence pessaries as a first-line conservative management option for stress urinary incontinence (Farrell, et al., 2007; Komesu et al., 2008; Maito, Quam, Craig, Danner & Rogers, 2006; Roehl & Buchanan, 2006). Incontinence pessaries are silicon devices of various styles and shapes (Figure 6).
When inserted into the patient’s vagina, incontinence pessaries support the bladder neck, increase the urethral length, and gently compress the urethra against the pubic bone during times of increased intra-abdominal pressure (Roehl & Buchanan, 2006). Incontinence pessaries “manually support and stabilize the urethrovesical junction, which the vaginal sling repair accomplishes surgically” (Roehl & Buchanan, 2006, p. 215). Incontinence pessaries can be used alone or in conjunction with other conservative treatment options such as fluid and dietary intake management and/or pelvic floor exercises. The knob of the incontinence pessary should be situated at or below the bladder neck (Figure 7) in order to stabilize the posterior urethra (Komesu et al., 2008).
Bladder neck support prostheses. The purpose of supporting the bladder neck is to anchor the urethra and prevent hypermobility (Sarma, Ying & Moore, 2009; Yip, 2011). A bladder neck support device works by compressing the urethra as it presses against the vaginal wall (Rigby, 2005). There are three types of bladder neck support prostheses: menstrual tampons, a tampon-shaped hollow tube called a Contiform©, and the silicone incontinence pessary (described in the previous section).

Menstrual tampons, like incontinence pessaries, compress the urethra from within the patient’s vagina. They can only be worn for short periods of time, are only effective in women with mild urinary incontinence, and should be used with a lubricant to prevent the cotton fibers of the tampon from sticking (Cameron, Jimbo & Heidelbaugh, 2013b; Rigby, 2005).

The Contiform© device (Figure 8) sits in the vagina behind the pubic bone and supports the bladder neck during times of increased intra-abdominal pressure (Allen, Leek,
The device is shaped like a hollow tampon and can be easily inserted and removed by most patients. They can be worn during daily activity or only during sporting activity and can be removed daily or left in for up to one month (Allen et al., 2008; Dwyer & Kredel, 2005). The Contiform© is not currently available for sale in Canada but is sold in Australia, the UK, and the EEC.

![Contiform© bladder neck support device and its placement in the vagina.](images/contiform.jpg)

**Figure 8.** Contiform© bladder neck support device and its placement in the vagina. (Images used with permission from Angus Taylor, Managing Director, Contiform International - [www.contiform.com](http://www.contiform.com))

**Weighted vaginal cones.** Weighted vaginal cones (Figure 9) are used to retrain the pelvic floor as opposed to acting as a support to pelvic organs (Haddad, Ribeiro, Bernardo, Abrao & Baracat, 2011; Karon, 2009; Pereira, de Melo, Correia & Driusso, 2012). They are considered a good option for pelvic floor retraining because it takes very little time to teach women how to use them. As the woman habituates to the weight of one cone she can move to the next heavier cone in the set (Herbison & Dean, 2013). In addition to providing pelvic floor exercise, the cones are inexpensive and reusable. Their use provides a type of
biofeedback in which the “sensation of one slipping out induces a pelvic floor muscle contraction which may both strengthen muscles and help to synchronize muscle contraction with increases in abdominal pressure” (Herbison & Dean, 2013, p. 3). As the woman moves from the lighter cones to the heavier cones it is deemed to indicate an improvement in pelvic muscle strength, and this can positively reinforce the continuation of their use.

Figure 9. Aquaflex®, Weighted Vaginal Cones (Photo and images used with permission from Savantini Limited - [http://www.aquaflex-cones.co.uk](http://www.aquaflex-cones.co.uk/))

**Intraurethral Devices**

Intraurethral devices are inserted into the urethra to block the leakage of urine (Anders & Bidmead, 2005). Intraurethral devices are also referred to as internal urethral devices. These devices are generally single use and disposable and must be removed before the woman can urinate. They are useful for short periods, such as during extreme exercise. They are small hollow silicone cylinders that are inserted into the urethra with the use of an insertion probe. They have an external flange that secures them in position and prevents them from migrating into the bladder (Anders & Bidmead, 2005). These devices use a
sterile balloon-tipped urethral insert that comes with an applicator and are inserted by means of an insertion probe (Figure 10). The sterile gel within the device molds to the shape of the urethra. These devices are small and very pliable, only as long as the urethra, and remain in place until the woman wishes to void, at which time the device must be removed, by gently pulling on the flange.

*Figure 10.* Internal urethral device with insertion probe. (Photo used with permission from Continence Product Advisor, London, www.continenceproductadvisor.org.)

**Behavioral and Lifestyle Interventions**

There are many behavioral and lifestyle modifications that a woman can make to help control stress urinary incontinence (Bettez et al., 2012; CCF, 2007; Herbruck, 2008; Karon, 2009). These include, but are not limited to: weight reduction, maintaining a voiding diary, bladder training, management of fluid intake, decreased smoking, management of constipation, pelvic floor exercises, and management of respiratory conditions such as asthma that result in coughing and increased intra-abdominal pressure (Abed & Rogers, 2008; Bettez et al., 2012; Borello-France et al., 2013; CCF, 2007; Christofi & Hextall, 2007; Goode et al., 2010; Herbruck, 2008; Karon, 2009; Khan & Rizvi, 2005; Kirby, 2006).
**Weight reduction.** Herbruck (2008) stated that one of the earliest interventions for stress urinary incontinence should be weight loss because “a 5% to 10% drop in body weight can improve UI [urinary incontinence] symptoms” (p. 190). She also noted that conservative treatments can be time-consuming and the results not seen immediately, so, although women need to take responsibility for their own health improvement, they need to be supported during this time in order to continue treatments.

**Voiding diaries.** Keeping a voiding diary (or bladder diary) of intake, output, and any triggers to incontinence is an easy way to identify “an individual’s natural voiding pattern and can help develop a toilet schedule” (Khan & Rizvi, 2005, p. 238). Not only will keeping a voiding diary alert the woman to the events that lead to incontinence episodes, such as high impact exercises, but it will also alert her to whether she has sufficient daily fluid intake (Abed & Rogers, 2008; Christofi & Hextall, 2007).

**Bladder training.** Bladder training can be used in conjunction with voiding diaries. Bladder training involves contracting pelvic floor muscles when the urge to urinate is felt. If the patient can contract the muscles long enough for the urge to subside and overcome the increased intra-abdominal pressure exerted with the contraction of the detrusor muscle, she will reduce the risk of urine leakage and extend the time between trips to the toilet. This technique is used commonly to help patients who have strong urges to urinate that they find difficult to overcome. The ultimate goal is to help the patient extend the time between voids and expand the bladder capacity over time (Christofi & Hextall, 2007; Goode et al., 2010; Karon, 2009; Khan & Rizvi, 2005). Bladder training requires that the patient be cognitively capable of understanding the instructions and understand that persistence is needed because the results may not be evident for many weeks (Karon, 2009).
Management of fluid intake. Management of fluid intake is used by as many as 38% of women who experience urinary incontinence (Abed & Rogers, 2008). It has been shown to result in a decrease in the number of urinary incontinence episodes, especially at certain times of the day, such as in the evening (Brown et al., 2006; Burgio & Goode, 2008; Dwyer & Kreder, 2005; Goode et al., 2010; Mathur et al., 2010). Researchers do, however, recommend a daily fluid intake of between 1500 and 2000 milliliters (Borello-France et al., 2013; Burgio & Goode, 2008). Fluid intake should be considered along with other lifestyle factors, such as body weight, exercise levels, and weather conditions (Christofi & Hextall, 2007).

Smoking cessation. Researchers suggest that there is a direct correlation between the number of cigarettes smoked per day and stress urinary incontinence in women (Demirturk et al., 2008; Madill, 2009; Pastore et al., 2007; Rigby, 2005; Siu, 2006). This may be due to the resultant coughing that accompanies long-term cigarette smoking that causes a rise in intra-abdominal pressure (Burgio & Goode, 2008; Khan & Rizvi, 2005; Mathur et al., 2010).

Products

Many women attempt to manage mild urinary incontinence with the use of absorptive products such as panty liners or incontinence pads, and for those with severe and uncontrollable incontinence, diapers or incontinence briefs are often used (Abed & Rogers, 2008; Evans, 2005). Products available for women include pads, leak guards, panty liners, belted undergarments, disposable underwear, and disposable briefs, as well as many reusable products (CCF, 2012). “Many women prefer [panty liners] as opposed to incontinence pads for their discreetness, although menstrual pads are not as effective in absorbing fluids and
managing odor” (CCF, 2012, p. 1278).

**Alternative Therapies**

**Acupuncture.** Eleven acupuncture points in the hand have been identified to represent the major acupoints of the external genitals, bladder, abdominal aorta, stomach, heart, adrenal glands, and kidneys (Kim et al., 2008). This therapy has not been studied extensively in western cultures, but it has been mentioned in the literature as one of the other potential therapies that warrants further investigation, along with hypnosis (Abed & Rogers, 2008; Cherniack, 2006; Christofi & Hextall, 2007; Riss & Kargl, 2011).

**Acupressure.** Chang et al. (2011) conducted a study to evaluate whether acupressure could be used to treat stress urinary incontinence. They stated that “in Eastern medicine, acupressure is a commonly used intervention for the management of urinary problems” (p. 1140) and that it is the least invasive of the various options available, but that it has not been widely studied. In their study, acupressure involved applying consistent pressure to eight identified acupoints on the back and legs that are believed to strengthen kidney and bladder function.
Chapter Four

Benefits, Complications and Adverse Effects

Women are constantly seeking effective and low-risk treatment options to manage their stress urinary incontinence. All forms of conservative treatment options have benefits. They also have some degree of negative implications, complications, or adverse effects, and many also require that the woman be motivated and compliant with the treatment to be effective (Ziv et al., 2008).

Strengthening Pelvic Floor Muscles

Pelvic floor muscle training. In women with stress urinary incontinence, conservative treatment using pelvic floor muscle training (PFMT) has been shown to work well in the short term and produce objective and subjective cure rates of between 35 and 80% (Bo, 2012; Christofi & Hextall, 2007; Karon, 2009). PFMT is now recommended as a first-line treatment for stress urinary incontinence (Schiotz, Karlsen, & Tanbo, 2008).

The key problem to adherence to pelvic floor muscle exercise regimes is lack of motivation if women are not being supervised (Borello-France, et al., 2013). Another problem is that it is time consuming and expensive for a trained professional to follow women repeatedly over many weeks or months to ensure that exercises are being done consistently and correctly. Other barriers to consistently performing PFMT reported by women include: illness of themselves or of someone in the family, vacation time, fatigue, work, personal conflicts, and boredom with the exercise regimen (Borello-France, et al., 2013). Horbach (2004) suggests that if patients are unable or unwilling to adhere to a regimen of pelvic muscle exercises, then other forms of treatment should be considered (such as the various devices described in Chapter 3).
Borello-France et al. (2013) reported that predictors for adherence to PFMT treatment plans were greatest in supervised individuals, and although they did not elaborate on these factors, they include: age, race, education level, employment status, caffeine intake, alcohol intake, frequency, type and severity of urinary incontinence, number of people in the household and their overall health status, the function of the pelvic floor muscles, and the physician’s evaluation of whether the participant would be likely to benefit from these conservative interventions. They found that when women received supervised treatments, the only predictors significantly associated with adherence to pelvic floor muscle training were: less frequent urinary incontinence episodes per week (<14 episodes per week) and higher quality of life (measured by a 36-item Short-Form Health Survey). At three months after randomization, when supervision ceased, the only variable significantly associated with adherence to pelvic floor muscle training was the strength of the pelvic floor muscles at baseline. Women who had stronger muscles at baseline were more likely to adhere to exercises. At 12 months post-randomization, the only variable that significantly predicted adherence to pelvic floor muscle training was whether or not the women could remember to do the exercises and could find the time (Borello-France et al., 2013). The authors conclude that it is very difficult to predict the factors that are most likely to influence a woman’s continued adherence to an exercise regime.

**Pelvic floor muscle training versus incontinence pessaries.** Richter et al. (2010) compared the use of incontinence pessaries to pelvic floor muscle training (n=446 women). In the study, 146 women were randomly assigned to the behavioral therapy group, which consisted of instructions for pelvic floor muscle exercises as well as strategies to prevent urge incontinence, 149 women were randomly assigned to the pessary only group, and 151
women were randomly assigned to receive both therapies. They concluded that participants in the behavioral therapy group had fewer incontinence symptoms at three months than those in the pessary group, however these differences were not sustained at twelve months. They also found that using the two modalities together did not result in better outcomes than single-modality therapy.

Kenton et al. (2012) conducted a similar study comparing the use of incontinence pessaries with pelvic floor exercises in the same group of 446 women. Their study differed in that they examined symptoms and a Health-Related Quality of Life scale (HRQOL) that measured health risks, functional status, and social and socioeconomic status (Centers for Disease Control and Prevention, n.d., HRQOL scale). The authors reported that there was significant improvement in both the pessary and behavioural groups at three months on each of the HRQOL and the symptom measures, but fewer women in the behavioral therapy group experienced stress incontinence. Perhaps the greater satisfaction with the results in the behavior therapy group stems from the fact that if pelvic floor muscles can be strengthened to the point where the woman is no longer incontinent, then she would not have to rely on a pessary and could continue doing pelvic floor exercises to maintain the strength of her pelvic floor.

**Pelvic floor muscle training versus the Paula Method.** Liebergall-Wischnitzer et al. (2009) compared the use of pelvic floor muscle training with the Paula Method for stress urinary incontinence treatment. Two hundred and forty five women were randomly assigned to either the Paula Method group or the pelvic floor muscle-training group. Over a 12-week period, they performed specific exercises for 45-minutes weekly with supervision, and they were also encouraged to perform the same exercises at home for 45 minutes a day. The
authors concluded that although both methods resulted in a decrease in urine leakage, the Paula Method was superior in terms of a cure rate, in that 15.2% more women reported being cured in the Paula Method group than in the pelvic floor muscle-training group. They cautioned that in spite of this, the Paula Method could not be recommended for widespread individual use because it is costly for participants to have individual professional training to perform the exercises correctly.

**Biofeedback.** Because of the low cost of biofeedback, the lack of side effects, and the information it gives the woman about the strength and duration of contractions of her pelvic floor during exercise, it is usually one of the preferred methods of treatment accompanied by pelvic floor muscle training (Rett et al., 2007). In 1948, Arnold Kegel recommended the use of pelvic floor muscle exercises along with a pneumatic device called a perineometer, to measure, by way of biofeedback, the strength of pelvic floor muscle contractions (Khan & Rizvi, 2005). “Biofeedback is useful in promoting correct contraction control and visualization of muscle activity because many women are unaware of the correct way to contract their pelvic-floor muscles and need some motivation” (Rett et al., 2007, p. 137). There are a variety of home-use devices available to provide feedback, including ones similar to the perineometer used by Kegel. These devices measure contraction pressure and duration, and often include surface electrodes that provide visual biofeedback to the woman (Bo, 2012).

Capelini et al. (2006) studied 14 women with stress urinary incontinence who used biofeedback with pelvic floor strengthening exercises for a period of 12 weeks. They concluded there were significant improvements in the parameters they analyzed (urodynamic tests, pad tests, and bladder diaries), and that these improvements continued to be maintained
at a three-month post-study assessment.

Demirturk et al. (2008) reached similar conclusions after they compared the benefits of biofeedback with interferential current in a prospective, randomized, controlled study (n=40 women). Twenty women underwent interferential current therapy, and 20 women underwent pelvic floor exercises via biofeedback. Treatments lasted five minutes per session, three times a week and each group received a total of five sessions. These investigators concluded that both treatments resulted in similar improvements and that interferential treatment does not cause damage to superficial tissues and is well tolerated by patients. They also suggested that interferential therapy may be preferential for patients for whom cooperation might be reduced, such as those with impaired vision or hearing, in those with difficulty understanding and following instructions, or in patients who are not willing to use intravaginal or rectal electrodes (Demirturk et al., 2008).

Huebner et al. (2011) reported improvement in psychological stress and in quality of life for the 108 participants of their study that compared home-use of electromyography biofeedback pelvic floor muscle training devices. In their study, women were trained in the use of one of three different devices with vaginal electrodes that provided biofeedback to the strength of pelvic floor contractions by way of visual and auditory responses (n=36 women in each group). The training period was 15 minutes twice daily for all participants. The quality of life indicators were measured at 4, 8 and 12 weeks using the a validated questionnaire (the King’s Health Questionnaire) and a visual analog scale of 1 to 10 that measured the degree of suffering experienced by the participant. Participants reported no difference between the three devices used, but all reported improved symptoms of stress urinary incontinence.
**Functional electrical stimulation and functional magnetic stimulation.**

Electrical and magnetic stimulation are more cost-effective than surgery, but they are time consuming and must be supervised by a trained provider, which may make either option less viable for many women. In spite of the inconvenience, it has been shown that “up to 75% of women with surgical referrals may not need surgery after treatment with ESUs [electrical stimulation units], as patients may be free enough from their symptoms post-treatment” (Herbruck, 2008, p. 192).

The use of functional electrical stimulation (FES) and functional magnetic stimulation (FMS) require skilled staff to assess the women and conduct the treatment. The women must be motivated to continue treatment two or three times a week for a continuous period of time (Bolukbas et al., 2005). The advantages of FMS are that it is non-invasive, because women do not need to undress for the treatment, and no electrical current enters the body, “only a magnetic flux” (Bolukbas et al., 2005, p. 300). In contrast, FES produces an electrical current that must travel through body tissue via an internal vaginal probe, and the women must undress for the treatment (Bolukbas et al., 2005). These investigators conducted a study of 22 women with urinary incontinence by dividing them into treatment groups to receive either FES (n=14) or FMS (n=8). All participants underwent 20 minutes of treatment, three times a week, for six to eight weeks. The success of the treatment modalities was based on a combination of perineometer values, digital examination, pad tests, urinary diaries and the patients’ impressions. The researchers concluded that both treatment modalities were equally effective in reducing stress urinary incontinence episodes, but the FMS modality was free of potential complications, such as injecting too strong an electrical current into the tissues, and did not require any intravaginal stimulation (Bolukbas et al.,
Mathur et al. (2010) argues that because there has not been enough consistency in the trials using FES and FMS, it is difficult to reach definitive conclusions about their true efficacy in the treatment of urinary incontinence. These authors suggest that this form of treatment should not be used routinely, except in women who are unable to identify the pelvic floor muscles. Women should be carefully selected for treatment with electrical stimulation and several contraindications for this therapy exist, including: women with cardiac pacemakers or implants, previous or current DVTs, a history of pelvic irradiation for cancer, pregnant women, women with total vaginal prolapse, the presence of a copper IUD, active bleeding, reduced vaginal sensation, or those with severe weakness of the urethral sphincter (Bolukbas et al., 2005; Stewart, 2010).

**Intravaginal Devices**

Intravaginal devices include incontinence pessaries, bladder neck support prostheses, tampons, and weighted vaginal cones. The choice of method is most often based on the woman’s preference and ease of insertion and removal.

**Incontinence pessaries.** The use of incontinence pessaries does not require that the woman be trained to insert and remove them periodically to clean them and for intercourse, but this is the ideal scenario. Many women can manage incontinence pessaries effectively with very little medical follow-up, as long as they have been taught to recognize the signs and symptoms of problems such as bleeding or a change in the quality or quantity of vaginal discharge (Abed & Rogers, 2008; Sarma et al., 2009; Wheeler, Lazarus, Torkington, O’Mahony & Woodhouse, 2004). Some women do require medical or nursing follow-up every three to six months for appliance removal and cleaning, and inspection of the vaginal
mucosa. These women are usually unable to remove the device themselves due to cognitive decline, arthritis, or because of the size of the device (Griebling, 2009).

Women who were successfully fitted after the age of seventy-two were found to be more likely to continue incontinence pessary use over the long-term than younger women, probably because older women were less likely to consider incontinence surgery as they aged (Friedman et al., 2010). Predictors of discontinuation of incontinence pessary use after a successful fitting and one year of use are: a history of previous prolapse surgery or hysterectomy, and continued stress incontinence (Friedman et al., 2010; Nguyen & Jones, 2005; O’Dell & Atnip, 2012; Sandhu, Wang, Mikhail, & Banks, 2010; Schaffer et al., 2012).

**Bladder-neck support prostheses.** Bladder-neck support devices are often reusable and some are disposable. Many can be inserted and left in place for extended periods of time, especially the reusable ones, and the disposable ones have about a twelve-hour life span (Farange, 2011). Discomfort with insertion and removal, pain, and spotting, were identified as major drawbacks of these devices (Ziv et al., 2008).

One such device is the Contiform Intravaginal Device, which was designed for patients without significant uterovaginal prolapse who are sufficiently dexterous and mentally alert to be able to insert/remove the device themselves with little or no supervision. The manufacturer (of the Contiform Intravaginal device) recommends that the device be replaced after one month, but with intermittent use some women are able to use the device for longer periods, thereby reducing the cost (Allen et al., 2008).

**Tampons.** Tampons were not originally designed as continence devices and are marketed for the containment of menstrual flow. Eighty-six percent of women with mild incontinence remained continent during exercise sessions when using tampons. Out of this
group only 29% with severe incontinence remained dry (Rigby, 2005). Tampons, when used as continence devices, are usually only worn for short periods of time, such as when a woman exercises, and if the vaginal mucosa is dry the cotton fibers may stick and cause discomfort when being inserted or removed (Cameron et al., 2013b; Rigby, 2005).

Ziv et al. (2008) conducted a study with 60 women with severe stress urinary incontinence using a tampon-like device that comprises a cover and core made up of low-friction nylon mesh that allows the passage of vaginal secretions, and an applicator similar to that used in tampons. The women used the device for twenty-eight days and success was measured by a combination of incontinence episodes, subjective reports of improved quality of life, ease of use of the device, and overall satisfaction. The authors concluded that 85% of the women in the study achieved greater than 70% reduction in urine loss and the device was easy to use to reduce episodes of stress urinary incontinence.

Weighted vaginal cones. Khan and Rizvi (2005) conducted a review of the literature in which 466 women used vaginal cones to exercise the pelvic musculature. They concluded that vaginal weighted cones were better than no active treatment but not significantly better than pelvic floor muscle exercises alone or electric stimulation. Herbison and Dean (2013) cautioned that perceived success with the use of the weighted cones may actually be as a result of pelvic organ prolapse, which traps the cone in the vagina behind a prolapsed bladder. A prolapse of the vagina below the level of the placement of the cone may also result in the cone staying in place even though the pelvic musculature is weak (Herbison & Dean, 2013). It is not possible to continually contract the pelvic floor muscles, and therefore some women have problems retaining the cones when not contracting those muscles (Herbison & Dean, 2013). The cones are therefore optimally suited for giving the
woman an impression of whether or not she is contracting the correct muscles, rather than actually strengthening the pelvic floor musculature (Herbison & Dean, 2013). A woman’s vagina is not a symmetrical cylinder with smooth sides, therefore the cone may also be held in place by the vaginal rugae or the tilt of the vagina (Herbison & Dean, 2013). For these reasons, weighted vaginal cones should not be used in women who have uterine, bladder, or vaginal prolapse (Herbison & Dean, 2013; Stewart, 2010).

Problems associated with the use of any of the intravaginal devices discussed above are: occlusion of the urethra to the point where the patient cannot empty her bladder (Allen et al., 2008) and local irritation of the vaginal mucosa, to serious complications, which are rare, such as incarceration of the device and potential sepsis (Farage et al., 2011). There have been a number of reports of problems associated with the use of pessaries that resulted in discontinuation of their use, even after a successful fitting. Pessaries for incontinence are most often discontinued as a result of bleeding, malodorous vaginal discharge, pain, and constipation (Sarma et al., 2009). Abed & Rogers (2008) noted that pessaries are often discontinued, in spite of providing urethral support, due to irritation of the vaginal mucosa, with associated discharge, odor, ulcerations, and bleeding. Farange et al. (2011) stated that although pessaries are a useful alternative to surgery, their use has not been widely embraced because they are often seen as “antiquated therapy and at worst, potentially dangerous” (p. 20). They reported that one study found that long-term use of pessaries was “invariably accompanied by trauma to the atrophic vaginal epithelium of the postmenopausal woman,” and that the cytologic changes “observed in association with pessary use reflect the mechanical trauma of the pessary and the resultant inflammatory and reparative response” (p. 20). Occasionally, a neglected pessary can cause serious concerns. Wheeler et al. (2004)
reported a case of a woman who had a pessary inserted for genital prolapse and stress urinary incontinence but missed her appointment at three months to have the pessary removed, cleaned and the vaginal mucosa examined. At six months she developed signs and symptoms of septicemia and it was discovered that she had a neglected pessary in situ. Other complications can include the formation of a recto-vaginal fistula, and small bowel incarceration (Wheeler et al., 2004), but these are extremely rare.

**Intraurethral Devices**

In clinical trials, the efficacy of intraurethral devices was measured by each device’s ability to prevent urine loss (Anders & Bidmead, 2005; Robinson et al., 2003). Although effective in preventing urine loss as measured by pad tests, all forms of intraurethral devices come with varying degrees of complications or adverse effects, such as: discomfort, difficulty inserting the device, hematuria, increased risk of urinary tract infections, and in extreme cases, if the device makes its way into the bladder, the need for endoscopic surgery to remove it (Anders & Bidmead, 2005; Greer, Arya & Smith, 2013; Haslam, 2004; Horbach, 2004; Rigby, 2005). Other reported drawbacks to the use of these devices include the awareness of the presence of the device, feelings of urgency, and urethral discomfort and pain. Horbach (2004) reported that in spite of the efficacy of these devices they tend to be poorly tolerated in general, but if women can tolerate an intraurethral device for 6 months, complications decrease substantially during long-term use.

**Products**

Multiple authors agree that continence strategies for older women tend to focus on containment products rather than other conservative treatment options (Stewart, 2010; Wagg et al., 2005). Older women presenting with urinary incontinence are more likely to get pad
assessments than detailed continence assessments (Wagg et al., 2005). However, if pads and containment products are deemed to be the best incontinence strategy, then health care providers should have a good understanding of the products available in order to make the best recommendation to the patient.

**Alternative Therapies**

**Acupuncture and acupressure.** Kim et al. (2008) conducted a randomized controlled trial to evaluate the effectiveness of acupuncture in reducing the incidence of stress urinary incontinence in women. Twenty-five women underwent 12 weeks of hand acupuncture treatment, in which 11 points in the hand were determined to be the main acupoints of the external genitalia, the bladder, the kidneys, the abdominal aorta, the stomach, and the heart. The control group of 27 women received no treatment. The authors concluded that urinary incontinence was reduced by up to 37% in the experimental group, and that this group also showed additional benefits such as: improvement in making friends, and improved sex life and social life, based on a previously developed quality of life questionnaire. This was the only study of its kind in this review.

Chang et al. (2011) investigated the efficacy of acupressure for the treatment of stress urinary incontinence. In their randomized single-blinded sham-controlled trial, 81 participants were randomly assigned to one of three groups, an experimental group (n=27), a sham group (n=27), and a control group (n=27). The women in the experimental group underwent a total of thirty sessions of 30 minutes of acupressure each over a ten-week period. The authors concluded that there was “significant [subjective] improvement in all domains of the Chinese version of the King’s Health Questionnaire” (p. 1139), as well as objective improvement in pelvic floor muscle strength, and reduction in the number of
reports of urine leakage, as well as their severity. The Chinese version of the King’s Health Questionnaire (CKHQ) measures quality of life domains including “role limitations, physical limitations, social limitations, personal limitations, emotional problems, sleep/energy disturbances, and severity measures” (p. 1144).
Chapter Five

Themes

Four themes arose from the literature review: the taboo nature of discussing urinary incontinence, how underreporting leads to underestimating the economic and social costs associated with urinary incontinence, the need for education of the public and health care professionals, and the role of the nurse in education and treatment.

Taboo Nature of Discussing Urinary Incontinence

Despite the profound impact of stress urinary incontinence, it is still a taboo subject for many women because it carries with it a social stigma (Booth, 2008; CCF, 2007; Siu, 2006). Unlike other health conditions, accurate statistics on the prevalence of stress urinary incontinence are difficult to source, because of this social stigma associated with it (CCF, 2007). In industrialized countries, researchers can only guess that the incidence of stress incontinence ranges from 30 and 60% of women (Madill, 2009). The problem of underreporting continues to be a worldwide problem and hampers research. Many women do not report the problem because they believe that it is a normal part of aging (Siu, 2006).

Apart from the embarrassment or belief that nothing can be done, social and cultural influences may be responsible for women’s reluctance to mention the problem. For example, in the Chinese culture, some elderly Chinese women are reluctant to discuss any personal matters with another person, especially if the other person is a male (Siu, 2006). Similarly, women in the Yukon, Northwest Territories, and Nunavut report less incidence of urinary incontinence than their more southern sisters (for example, 2.58% in Yukon, NWT/Nunavut, compared to 5.27% in Saskatchewan and 4.69% in Manitoba) (CCF, 2007). This discrepancy may be due to the nature of culture and value systems, which include
reluctance to report. Multiple researchers agree that healthcare providers can reduce the stigma associated with stress urinary incontinence by sharing educational resources, dispelling myths and taboos, and making women more aware of helpful lifestyle changes (Bray et al., 2007; CCF, 2007; Kirby, 2006; Stewart, 2010; Taylor et al., 2013).

**Underreporting Leads to Underestimation of Costs**

One reason why it is difficult to measure the cost of urinary incontinence is because cost cannot be only measured in dollars. There are also social costs associated with urinary incontinence. The burden on quality of life is massive, impacting a woman’s social, sexual and physical activities (Avery & Donovan, 2008; Bo, 2012; Clark, 2008; Stewart, 2010). Guilt and humiliation are social costs that take their toll on caregivers who have to institutionalize their elderly parents as a result of loss of bladder control (CCF, 2007). Even though it is accepted in the health-care community that there is a link between incontinence and falls, there is still a need for evidence to “support continence promotion as an intervention to reduce falling” (Loharuka & Barrett, 2005, p. 55).

Many long-term care facilities are concerned with the rising costs of human resources as well as operational and capital expenditures, including costs associated with non-medical supplies. The CCF (2007) argues that if facilities increase the number of staff, those additional human resource expenditures will be defrayed when less incontinence products are needed, not to mention the improved quality of life for the residents and the potential resultant cost savings there. Individuals living with incontinence in the community spend an average of $1,000 to $1,500 CAD on incontinence supplies per year. These supplies are not covered by provincial public health plans or by most private insurance companies, so the full cost is borne by the individual and their family (CCF, 2007). If incontinence is not treated,
costs associated with its management only increase with time because incontinence can lead to other conditions which will require further treatment such as depression, falls, fractures, and skin lesions (Brown et al., 2006; Cameron et al., 2013a; Chong, 2011; Elneil, 2008; Goode et al., 2010; Griebling, 2009; Mathur et al., 2010), all requiring more and costly treatment.

With the advancing age of the baby boomers, the costs associated with all forms of incontinence both in the community and in long-term care facilities will increase unless something is done to address the problem sooner rather than later. “Considering that this condition does not have a high ‘profile’ in Canada, it is important that Canadians be given accurate information on the true burden of the disease, the treatment options available, as well as health policy issues related to UI [urinary incontinence]” (CCF, 2007, p.2).

**Need for Education**

Education about the risk factors for stress urinary incontinence and the treatment options available are essential to help women make informed choices in order to manage their condition (Hanzaree & Steggall, 2010; Kirby, 2006). Health promotion campaigns, the media, and changing societal attitudes are helping to erode the negative social stigma associated with stress urinary incontinence, but the progress is slow (Evans, 2005). Many women are still choosing to manage and cope with the problem themselves, and this could be due to poor knowledge about available management options, embarrassment, the availability of absorbent containment products in shops, low expectations of treatment from health care providers, and/or fear of surgery (Evans, 2005).

For women, awareness should start as early as possible with education about the risk factors for developing stress urinary incontinence, including: age, race, hormonal status,
hysterectomy, childbirth, obesity, high-impact exercise, coffee and alcohol consumption, fluid intake, diet, chronic constipation, occupations that require heavy lifting, and smoking (Abed & Rogers, 2008; Cameron et al., 2013a; CCF, 2007; Christofi & Hextall, 2007; Gray, 2004; Grewar & McLean, 2008; Karon, 2009; Rigby, 2005). Some of these risk factors are avoidable and some are not. Women cannot change their age or race, and may not want to take medications to change their hormonal status, but they do need to be informed.

Women over the age of 40 have more problems with incontinence than younger women (Abed & Rogers, 2008; CCF, 2012) and women of increasing age are shown to be less likely to seek treatment (Pastore et al., 2007). There is evidence that shows that women of Caucasian race have more risk of incontinence than those of other races (Abed & Rogers, 2008; Bradley et al., 2010; Cameron et al., 2013a; Chong et al., 2011; Goode et al., 2010; Elneil, 2009; Spiteri & Khullar, 2008). Multiple authors have argued that perhaps this statistic is as a result of Caucasian women taking part more often in research into the causes of incontinence than women of other races (Capelini et al., 2006; Castro et al., 2008; Kenton et al., 2012; Richter et al., 2010).

A decline in naturally occurring hormones at menopause is believed to increase the risk of stress urinary incontinence because of atrophy of the genital tract (Kapoor & Freeman, 2008; Spiteri & Khullar, 2008; Herbruck, 2008). Previous hysterectomy has also been shown to be a risk factor for developing incontinence, perhaps as a result of the loss of pelvic supports (Cameron et al., 2013a; Goode et al., 2010; Kirby, 2006; Stewart, 2010). Women experience more stress urinary incontinence during pregnancy, but this problem usually resolves after delivery (Madill, 2009). “It is thought, however, that incontinence associated with pregnancy and delivery may be a risk factor for incontinence in later life”
In addition, giving birth vaginally as compared to only having ever had Cesarean deliveries, the use of instruments to assist delivery, and increased maternal age, increase the risk of a woman developing stress urinary incontinence later in life (Madill, 2009).

Urinary incontinence is often suffered in silence, and this is why it is important to recognize the work of patient advocacy groups and government lobbyists in improving health care services for those sufferers (Taylor et al., 2013). Incontinence advocacy groups like The Canadian Continence Foundation (TCCF) strive to ensure that all urinary incontinent Canadian consumers have access to evidence-based therapies for urinary incontinence. Taylor et al. (2013) suggest that health care policy-makers have not given enough serious consideration to the issues of the taboo and stigmatization associated with the problem. “A public health awareness campaign would help to de-stigmatize the condition and educate people about some of the effective treatment options” (CCF, 2007, p. 30). The CCF (2007) also reported that one survey of sixty-five websites that were supposed to provide information about urinary incontinence had minimal Canadian content, had reading levels that were “too high for the average consumer” (p. 30), and had low quality information specific to urinary incontinence.

A survey of family physicians’ knowledge of urinary incontinence found that “although most respondents reported that urinary incontinence was common in their practices, less than half (46.0%) indicated that they clearly understood incontinence and just 37.9% had an organized plan for incontinence problems. Only 35.0% of respondents felt very comfortable dealing with incontinence” (CCF, 2007, p. 31). From these statistics, it is clear that family physicians need resources to understand and counsel women on how to
manage incontinence.

In 2010 the Canadian Continence Foundation stated, “incontinence can always be cured, treated, or managed successfully” with the right investigation and treatment (Anders & Bidmead, 2005; CCF Users, Facts on Incontinence, para.3). Whatever the cause of urinary incontinence, conservative treatment should be the first line of management in primary care (Huebner et al., 2011). Conservative treatment has fewer side effects [than medication or surgical treatment] and can result in long-term significant improvement in symptoms (Bolukbas et al., 2005). These treatments are suitable for women for whom surgery is not an option for any number of reasons, including: women who are poor surgical candidates, women who find surgical wait times too lengthy, and/or women who simply do not wish to have surgery (Anders & Bidmead, 2005). Also, many women are “willing to accept improvement over cure to avoid the risks associated with surgery performed under general anesthesia” (Appel & Davila, 2007, p. 288).

Many women with stress urinary incontinence tend to seek medical help only when the symptoms have become too severe for them to manage alone (Kirby, 2006). This is why it is so important that women be identified and treated in primary care where the opportunities present themselves for health professionals to ask about the woman’s continence status and to treat and or refer accordingly. Visits to community health clinics or from community health nurses for routine home visits, check-ups for blood pressure, pap smears, postnatal check-ups, menopause clinics, or to review medications are ideal opportunities for continence status questions to be discussed.

Advertising in doctor’s offices and clinics with posters and pamphlets about continence can facilitate non-threatening and non-judgmental conversations about
incontinence. Another way to promote continence, to inform women, and to reduce the stigma associated with incontinence would be for health authorities to establish “dedicated continence promotion clinics in a community care settings staffed by specialist continence providers…..particularly if efforts are made to make the clinic as user-friendly as possible to the clientele” (Taylor, 2013, p 101).

Using carefully worded and short survey questionnaires are a good way to elicit valuable information in a very short time with very little effort, and they can also be used later for comparison of patient symptoms and research (Riss & Kargl, 2011). Questionnaires can uncover important quality of life issues that measure the impact of stress incontinence on health (Avery & Donovan, 2008; Hu & Wagner, 2005; Kwon et al., 2010) and might also help uncover what adaptive behaviors women have utilized to minimize the symptoms of their condition (Kenton & Mueller, 2006). Questions asked should be worded in such a way that women understand that it is safe to reveal the problem. Asking the woman if she has ever experienced any leakage of urine might elicit a response that can be acted upon; whereas, asking women if they have ever been diagnosed with stress urinary incontinence may result in a negative response if the woman does not know the correct definition of the condition.

Health-care consumers often feel vulnerable because they lack confidence in their health-care providers to offer helpful advice, especially when it comes to the use of products for urine containment or resources for information (Paterson et al., 2003). With knowledge and careful assessment of the client, the health care professional should be able to recommend advice that will be appropriate for each client (Paterson et al., 2003). Nurses and physicians should encourage women to seek help and not ‘put up with’ incontinence as an
inevitable part of ageing (Stewart, 2010). This is why it is important for primary care providers to understand conservative treatment options.

The Role of the Nurse in Education and Treatment

One of the greatest challenges facing women is their unwillingness to talk about urinary incontinence. If nurses could educate women that urinary incontinence is not a normal part of aging or of being a woman then women would begin to demand that this problem get the attention required to effectively treat it without resorting to surgery as the first line of therapy (Bardsley, 2004). Nurses are well situated to develop caring relationships with their clients, and as such should ensure that they determine the goals, expectations for quality of life, and needs of their client before pursuing treatment options (Ng et al., 2008; Riss & Kargl, 2011). If health care practitioners placed posters, pamphlets and leaflets in common areas such as clinic waiting rooms, the topic of incontinence might be easier for women to broach, and this would help dispel the hesitation associated with discussing it (Stewart, 2010).

Nurses should begin by asking all women, regardless of age, whether they are experiencing incontinence and if this has impacted their sexual lives. This question is often overlooked in the patient assessment, and women may be reluctant to raise a health issue that’s more often regarded as a social burden than as a medical condition. Nurses are well situated to broach the sensitive topic of sexual dysfunction related to incontinence and to provide counseling and referral. Katz (2009) suggested that if women and their partners understood that urine is sterile and not dirty it may help them overcome any feelings of disgust if some urine is lost involuntarily during periods of intimacy.

Nurses are often the first contact that women have in a clinic therefore they are
ideally positioned to instruct patients on the use and management of incontinence pessaries (Herbruck, 2008). “Urogynecology nursing, continence nursing, and the use of vaginal pessaries are specialty areas of nursing in Canada. Interested nurses could make a valuable contribution through research and clinical practice to the limited knowledge in this field” (McIntosh, 2005, p. 41). Researchers have found that nursing interventions significantly reduce women’s reports of incontinence and help them stay on track with their exercise regimens (Ng et al., 2008).
Chapter Six

Conclusions

Urinary incontinence is a prevalent and important condition that affects the lives of Canadian women. Canadian women with stress urinary incontinence need not suffer in silence, as there are a variety of treatments available that will allow incontinence sufferers the chance to live without bulky aids such as adult diapers and pads, will decrease their personal health care costs, increase their quality of life, return to symptom-free living, and decrease health costs for the overall health care system.

Based upon the findings in this scoping study, it is possible to make some recommendations: Using pelvic floor muscle exercises as a first line of therapy for stress urinary incontinence management is highly recommended (Bo, 2012; Borello-France et al., 2013; Capelini et al., 2006; Castro et al., 2008; Rett et al., 2007; Santacreu & Fernandez-Ballesteros, 2011). Price et al. (2010) found that there were reports of improvement rates of up to 70% in women with stress urinary incontinence who performed appropriate pelvic floor exercises. They defined “appropriate” as “a trial of supervised PFMT [pelvic floor muscle training] of at least three months’ duration” and “a pelvic floor muscle training programme [that] should comprise at least eight contractions performed three times per day” (p. 314). The key is to ensure that exercises are done correctly and consistently (Holroyd-Leduc et al., 2006; Madill, 2009).

Many women lose interest or lose hope and resort to surgery in the end if they do not receive support, at least at the outset of treatment (Horbach, 2004). If a woman is not able to locate and isolate her pelvic floor muscles, then pelvic floor muscle training combined with biofeedback and weighted vaginal cones was found by Parkkinen (2004) to be an
effective treatment for women with stress urinary incontinence, especially since once trained, women could use these methods at home over the long term to strengthen the pelvic floor and improve continence.

The use of vaginal pessaries was the third most often reported treatment option for stress urinary incontinence in women, after pelvic floor muscle exercises and exercises combined with biofeedback (Anders & Bidmead, 2005; Buchsbaum, 2006; Clemons et al., 2004a; Clemons et al., 2004b; Donnelly et al., 2004; Farrell et al., 2007; Hanzaree & Steggall, 2010). According to Maito et al., (2006) “every woman with symptoms of stress urinary incontinence should be offered management with a pessary” (p. 83). McIntosh (2005) stated that "nursing clinics devoted to the assessment, fitting, and follow up of vaginal pessaries are highly effective and cost saving” (p. 47).

Research approaches differed depending on the socially acceptable treatment modalities used in different cultures. For example, most of the studies that were conducted in Norway and Finland focused on pelvic floor muscle therapy and physiotherapy; Hong Kong and Korea focused on acupressure and acupuncture; Turkey on functional magnetic stimulation, functional electrical stimulation, interferential current and biofeedback; England on continence products and the role of nurses in managing urinary incontinence in women, and finally the United States and Canada focused their articles on all other areas of treatment, with the exception of acupressure, acupuncture, and functional magnetic stimulation. Perhaps this is indicative of how socially acceptable treatment options are practiced in different parts of the world, and this may guide future research into areas of treatment that have not been considered traditional in our Western culture.

In conclusion, in order to influence policy-makers that the problems associated with
stress incontinence are worth investment, more accurate statistics on the incidence of incontinence are needed. In order to get better statistics the taboo and social stigma associated with incontinence must be removed. In order to remove the social stigma and taboo, more education of the public and health care providers is needed. Unless one can put a price tag on diminished quality of life, it is difficult to persuade policy-makers to pay attention to this problem.

**Further Research**

While the question of how to conservatively manage stress urinary incontinence in women has been studied from many angles in many countries for many years, no definitive one-size-fits-all solution has been found. Although there may never be one solution that suits all women everywhere, there are still a number of areas where further research could advance this knowledge, including:

- Development and testing of simple and quick questionnaires that can be used by health care providers to guide diagnosis and treatment (Bradley et al., 2005; Brown et al., 2006; Kenton & Mueller, 2006).

- Further investigation of the efficacy of intravaginal devices such as pessaries and other urethral support devices such as the Contiform or vaginal cones (Allen et al., 2008; Herbison & Dean, 2013);

- Investigation of treatment options for women who are older or who have had failed surgery for stress urinary incontinence (Appell & Davila, 2007; Greer et al., 2013; Karon, 2009);

- Examination of the impact of lifestyle issues such as smoking, diet, and exercise (Christofi & Hextall, 2007; Rigby, 2005);
- The development of a comprehensive directory of incontinence products (Paterson, 2003);
- Studies designed to explore effects of incontinence on sexual functioning (Bradley et al., 2010; Katz, 2009; Riss & Kargl, 2007);
- Recommendations for nursing education in schools of nursing programs (Haslam, 2004);
- Exploring ways to reduce the taboo associated with the condition and encouraging women to seek help as soon as they identify the problem (CCF, 2007; Katz, 2009; Kirby, 2006; Siu, 2006; Stewart, 2010);
- Explorations of the experience of stress urinary incontinence in women in ethnic subgroups (Cameron et al., 2013a; Maito et al., 2006; Taylor et al., 2013).
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