Pelvic Floor Muscle Exercise Protocols for Post-Prostatectomy Urinary Incontinence: A Survey of Physiotherapists Current Practice in Canada

by

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Abstract

This study collected information from physiotherapists across Canada about their current practice with regard to Pelvic Floor Muscle (PFM) exercises in patients with post prostatectomy incontinence. The study examined the similarities and differences among physiotherapists with respect to the application of PFM exercise protocols for treatment of post prostatectomy incontinence. The study also compared the similarities and differences found in the protocols used by Physiotherapists with that reported in the literature.

340 physiotherapists from the Women's Division of the Canadian Physiotherapy Association and who treated men with post prostatectomy incontinence were surveyed using a specifically designed questionnaire that collected data on the type and the progression of PFM exercise protocols.

The survey results gave some insight into the selection and type of exercise protocol used most frequently by Canadian physiotherapists. All the physiotherapists included strength and speed contractions in their PFM exercise protocols, which addresses some of the principles of exercise prescription. There were common trends in the hold time of contraction and relaxation, the number of times a day to perform PFM exercises and the factors affecting the number of treatments received by patients. There were similarities between the study findings and the literature on the number of times a day to perform PFM exercises, and marked differences in the number of repetitions and number of contractions of PFM exercises performed in an exercise protocol. These findings suggest that although Canadian physiotherapists show some similarities in the

PFM exercise protocols used it does not reflect what is reported in the literature. There is therefore a need to standardize PFM exercise protocols used in the treatment of post prostatectomy incontinence.

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Chapter One

Introduction

In Canada, the number of men diagnosed with prostate cancer increased from 20,500 in 2005 to an estimated 22,300 in 2007 (Prostate Cancer Research Foundation of Canada, 2008). This increase in the incidence of prostate cancer is largely due to increased public awareness about the disease (Palmer, Fogarty, Somerfield, & Powel 2003) which has led to more men being screened at younger ages for prostate cancer. The increase in diagnosis of prostate cancer comes with an associated increase in the number of radical prostatectomies (Talcott et al., 1998) (i.e. surgical removal of the prostate gland).

Urinary incontinence is one of the most distressing and significant post operative side effects of radical prostatectomy and negatively affects the quality of life of patients (Cooperberg, Master & Carroll, 2003). The increase in the number of radical prostatectomy surgeries has consequently resulted in the increase in the incidence of post prostatectomy urinary incontinence as a side effect (Ficazzola & Nitti, 1998). Stress incontinence is the most commonly reported form of post prostatectomy incontinence, and is described as the involuntary loss of urine associated with increased intra abdominal pressure (Abrams, 2002).

Patients suffering from post prostatectomy incontinence are often referred to physiotherapists specialized in treating urinary incontinence. Physiotherapists generally

use conservative treatment approaches such as electrical stimulation, biofeedback, behavioral techniques and pelvic floor muscle (PFM) exercises to treat urinary incontinence. Among all the conservative treatment options, PFM exercises are most common.

Traditionally PFM exercises were used with women to treat stress incontinence. A recent systematic review by Hay-Smith, Bo, Berghmans, Hendriks, de Bie, and van Waalwijk van Doorn (2006) has validated the effectiveness of PFM exercises in treating stress incontinence in women. Based on the effectiveness of PFM exercises in women, this treatment is now used with men with post prostatectomy incontinence as a means of controlling their incontinence. Research suggests that PFM exercises may be effective in controlling incontinence in post-prostatectomy patients. Van Kampen et al. (2000) demonstrated measurable improvements in incontinence levels with a PFM exercise program in 88% of men with post prostatectomy incontinence, compared with 56% in a control group that received placebo PFM stimulation. A systematic review by Hunter, Moore, and Glazener (2007) on the conservative management of post prostatectomy incontinence, which included PFM exercises, suggests modest evidence of positive effects of PFM exercises on post prostatectomy incontinence control.

Despite some evidence of the effectiveness of PFM exercises in controlling incontinence in post-prostatectomy patients, there are limited numbers of published PFM exercise protocols. A comprehensive review of the literature revealed only two published protocols for PFM exercises. One was published by the Agency for Health Care and Research (Miller, Kasper, & Sampselle, 1994) and the second by Dorey (2004) as part of

her research on conservative treatment of erectile dysfunction. Neither of these protocols are based on empirical evidence nor on the principles of exercise prescription and therefore cannot be considered "gold standard".

Across Canada, physiotherapists use varied PFM exercise protocols when treating post-prostatectomy related urinary incontinence. This variation in the practices may be attributed to the diverse level of education, knowledge, and experience with post prostatectomy urinary incontinence. In order to promote consistent and best practices it is important to develop PFM exercise protocols which are evidence based and utilize principles of exercise prescription. Such protocols cannot be developed without benchmarking what PFM exercise protocols physiotherapists across Canada are currently using to treat post-prostatectomy urinary incontinence.

One method to determine treatment choices and practice pattern is through a survey of practicing physiotherapists (Bekkering et al., 2003; Harris & Susman, 2002). The use of a survey provides a means of determining if there are similarities or consistencies amongst physiotherapists. Surveys are a commonly used method of data collection both within and outside the social and health sciences community (Shi, 1997) and can be used for both descriptive and exploratory research purposes. Types of research questions that can be addressed or answered through survey research relate to attitudes, characteristics, opinions, feelings, knowledge, facts, behaviors and experiences (Shi, 1997). When little is known or reported about a specific topic the use of survey methodology is a suitable choice for research into that topic area.

This study will use survey methodology to achieve the following specific objectives:

1) To gather information about type, duration, frequency and progression of post prostatectomy PFM exercises used by physiotherapists, and describe the findings;

2) To compare the findings from the survey with what is reported in the literature with particular attention to the number of repetitions per set and total numbers of contractions patients are to perform in a day;

3) To determine what client, therapist, environmental and socioeconomic related factors influence the total number of treatment sessions patients receive in their treatment program.

Chapter Two

Literature Review

The literature review included the examination of two broad topics: pelvic floor muscles exercises and surveys as a method of data collection. A literature search was conducted using the key words post prostatectomy incontinence, pelvic floor muscles, exercise physiology and PFM exercise protocols. Databases searched included Cinahl, Medline, PEDro, Cochrane Library and Pub Med for the years January 1996-March 2008. Types of studies searched included: randomized, non-randomized, and clinical reviews published in the English language.

The first area of the literature review focused on the application of PFM exercises as a means of treatment for post prostatectomy incontinence. The following topics are discussed as part of the review: epidemiology of prostate cancer; functional anatomy of the pelvic floor muscles; the effects of radical prostatectomy on urinary continence; and PFM exercises as a treatment for urinary incontinence and PFM exercise protocols. The principles of exercise prescription are also reviewed.

The second area of the literature review explores the use of surveys as a method for data collection. The use of surveys in the social sciences is discussed broadly reflecting issues related to practice, actions and attitudes. The impact of question design and the types of questions used in surveys significantly influences the interpretation of study outcomes.

2.1 Post Prostatectomy Incontinence and PFM exercises

Epidemiology of prostate cancer.

The National Cancer Institute of Canada [NCIC] (2007) reported prostate cancer to be among the top three cancers that account for 55% of all new cases diagnosed in Canada. Enhanced public awareness of prostate cancer and acceptance of more routine prostate examination including prostate-specific antigen (PSA) screening increased the detection of prostate cancer to 27.0% of all new cases of cancers (NCIC, 2007). Prostate cancer was ranked third in mortality causing 4,300 deaths out of all cancer deaths i.e. 72,700 deaths. Despite the rise in prostate cancer diagnosis there has been no significant correlated rise in mortality, rather the NCIC reported a 2% decrease in mortality from 1994-2003 and the current death ratio is reported at 21 out of every 1,000 diagnosed cases of prostate cancer. Screening for prostate cancer is being performed at younger ages, as early as age 45, and this has decreased the age at which detection of prostate cancer occurs (Crawford, 2003). The NCIC reports that 46.6% of prostate cancer is diagnosed in men over the age of 70, however since 1990 incidence rates of prostate cancer has increased in younger men particularly those in the 50 – 69 year age bracket. Distribution per age category for prostate cancer reported in 2007 by the NCIC are: 1.5% for ages 40-49, 15.7% for ages 50-59, 35.9% for ages 60-69, 31.4% for ages 70-79 and 15.2% for age 80 and above. This shift in age reinforces the importance of improving the rate of recovery of post prostatectomy incontinence.

The early screening for prostate cancer and the increased detection of prostate cancer in the 50-69 age groups have increased the desire and demand for radical

prostatectomy (Sebesta, Cespedes, Luhman, Optenberg, & Thompson, 2002). Most men with prostate cancer view radical prostatectomy, which has a high 10-year survival rate, as a cure and a means to maximize their survival (Roehl, Han, Ramos, Antenor, & Catalona, 2004). It is commonly the treatment of choice because of the longer cancer free life span achieved with surgery as compared to conservative treatments such as external beam radiation, brachytherapy or watchful waiting. However, with increased performance of radical prostatectomy comes the associated increased incidence of the post prostatectomy side effect of urinary incontinence (Ficazzola & Nitti, 1998). Up to 78.6% of post-prostatectomy patients may be incontinent following removal of their urinary catheter (Wille, Sobottka, Heidenreich, & Hofmann, 2003) at 7-15 days post-operatively, with 30% having marked incontinence 8 weeks postoperatively (Moore, Griffiths, & Hughton, 1999). There is reported incidence of urinary incontinence ranging from 30% (Peyromaure, Ravery, & Boccon-Gibod, 2002) to 96% (Bales et al., 2000) within the first 6 months post prostatectomy. While previous studies have shown the presence of incontinence one - year post prostatectomy surgery to range from 8.4% (Stanford et al., 2000) to 31.7% (Sebesta et al., 2002).

Re education of the pelvic floor muscles is crucial in assisting with regaining continence following prostate surgery hence knowledge and familiarity with these muscles is important.

Functional anatomy of the pelvic floor muscles.

The "pelvic floor" includes all the structures supporting the pelvic organs which rely on their attachments to the pubic bones, muscles, and connective tissue. It is composed predominantly of striated muscles that are referred to as the Levator ani (Brooks, Chao, & Kerr, 1998). The three components of pelvic floor muscles are:

1. The levator ani comprised of the pubococcygeus, iliococcygeus, ischiococcygeus, and puborectalis;

2. The urogenital component comprised of the deep transverse perineal muscle, and

3. The superficial perineal muscle consisting of the bulbocavernosus, ischiocarvenousus, superficial transverse perineal, and the external anal sphincter.

The pelvic floor muscles are designed to perform a mixture of functions including: 1) maintaining urethral pressure (Lose et al., 2002); 2) maintaining closure of the bladder neck and anal opening, and 3) raising the urethral pressure during activities that cause increased intra abdominal pressure such as coughing, sneezing, and jumping. They also indirectly affect the emptying reflex by inhibiting the bladder and rectal muscle, and provide support for the pelvic organs (Bø & Talseth, 1997; Miller, 2002; Sampselle & DeLancey, 1998).

The male lower urinary structure consists of the bladder, prostate gland, urethra, and the external sphincter. The continence mechanism of the male consists of smooth muscles of the bladder base, bladder neck and striated muscles of the rhabdosphincter (Elbadawi, 1996). There are two components, the intrinsic and external urethral sphincter that contribute to urinary continence (Pfister, Cappele, Dunet, Bugel, & Grise, 2002). The smooth muscle fibres of the intrinsic component originate at the bladder neck, forms a circular collar extending distally and surrounds the proximal portion of the urethra (Elbadawi, 1996). This portion of the bladder neck is often referred to as the internal or proximal urethral sphincter, and is largely responsible for passive continence during the filling phase of the bladder. It also provides a continence mechanism that is independent from the external sphincter (Brooks et al., 1998). The external component of the urinary sphincter is made up of striated muscle fibres called the rhabdosphincter (Elbadawi, 1996) and is responsible for voluntary urinary control. It is this external component of the urethral sphincter that is affected during the procedure of prostatectomy.

The effects of radical prostatectomy on urinary continence.

Radical prostatectomy as a treatment option for prostate cancer has been in use since the beginning of the 1900s. Over the years the surgical technique has been greatly refined, such that there is decreased mortality and minimum morbidity, increased probability for continence and erectile function and quicker return to pre surgical level of activity (Crawford, 2003). Although urologists have a better understanding of the periprostatic and pelvic floor anatomy, and have adopted an anatomical nerve sparing

approach to radical prostatectomy in attempts to decrease damage to the continence mechanism (Pfister et al., 2002), there continues to be a risk of post-prostatectomy incontinence.

An anatomic approach with preservation of the intrinsic sphincter function during surgical removal of the prostate, affects the severity of post prostatectomy incontinence (Pfister et al., 2002). Other factors such as experience of the surgeon (Selli et al., 2004), patients' age (Stanford et al., 2000) and the preservation of the retro pubic structures, nerves and the bladder neck (Braslis, Petsch, Lim, Civantos, & Soloway, 1995) contribute to the reduction of post prostatectomy incontinence.

The preservation of the bladder neck and retention of the normal anatomic structure of the sphincter and its nerve supply increases the likelihood of regaining continence (Bianco et al., 2003). However, post prostatectomy incontinence remains a significant problem in the 8.4%-32% of men who continue to be incontinent one year post surgery (Stanford et al., 2000; Sebesta et al, 2002). Therefore the need for effective PFM re-education and training as a treatment of choice for regaining continence is warranted.

PFM exercises as a treatment for urinary incontinence.

Pelvic floor muscle exercises were first described by Dr. Kegel in 1948, and were introduced as a treatment method to decrease and/or control stress urinary incontinence in women (Kegel, 1951). The effectiveness of PFM exercises for regaining continence in women (Bø, 2003; Dattilo, 2001) has led to its use in the treatment for post prostatectomy

incontinence. PFM exercises are based on a biological rationale that a strong fast contraction of the levator ani muscle will put pressure on the urethra thus increasing the intraurethral pressure and preventing urine leakage during increased intra-abdominal pressure (Mathewson-Chapman, 1997). Focus is on re-educating the pubococcygeus, levator ani and bulbocavernosus muscles. Behavioral training such as PFM exercises for continence control is looked upon favorably due to the conservative and non-invasive nature of treatment, and the ability of patients to perform exercises independently.

PFM training has often been combined with other adjunct treatments such as electrical stimulation, biofeedback, bladder retraining, medication and dietary modifications in an attempt to gain continence in post prostatectomy patients. The constant variable in all the studies reporting conservative treatment for post prostatectomy incontinence was some form of PFM exercises.

The benefit of PFM re-education in the early post prostatectomy stages of incontinence is widely emphasized (Meaglia, Joseph, Chang, & Schmidt, 1990; Peyromaure et al., 2002; Van Kampen et al., 2000; Filocamo et al, 2005), particularly as more men have post prostatectomy incontinence in the first 8 to 12 weeks after surgery. Pelvic floor muscle exercises may assist to improve continence up to 12 months post surgery (Parekh et al., 2003). Unfortunately the protocols reported in the research literature are poorly described and highly variable and definitive evidence is lacking.

PFM exercise protocols.

The literature search for PFM exercise protocols focused on studies that provided some details on, or made reference to one of the following components of exercise prescription: a) length of hold of contraction, b) length of relaxation between contractions, c) number of repetitions, d) total number of contractions a day e) number of times per day, and f) strength of contraction (maximum or sub maximum). Ten studies met the inclusion criteria and were included for review.

Table 1 summarizes the components of exercise prescription described in each of these ten studies and the studies that addressed these components. a) L*ength of hold of contraction* varied from 3 to 30 seconds and was specified in six studies (Table 1). However, only one study reporting greater than 10 seconds hold and this was for endurance contractions which ranged from 20-30 seconds. b) *Length of relaxation between contractions* was only reported by four of the studies as part of their protocol, and spanned between 6 to 30 seconds. The ratio between the lengths of relaxation to the length of contraction reported ranged between 2:1 and 3:1 in the four studies reporting both length of relaxation and length of contraction for strength. c) *Number of repetitions* varied from 8 to 25 but was reported by eight of the ten studies. d) *Number of total contractions per day* was reported by six of the studies and ranged from 30 to 100, this was determined by the number of times per day PFM exercises were performed and how many repetitions were performed. e) *Number of times per day* was reported by seven of the 10 studies, with majority performing PFM exercises 3 times a day. f) *Strength of*

contraction (maximum or sub maximum) was only reported by two studies at 70% and 65-75% of maximum strength.

The most varied reporting in the studies reviewed was the *number of repetitions* and the *total contractions per day,* with the number of repetitions and the number of times a day being reported by the majority of the studies reviewed.

Table 1

Exercise Prescription Protocols for PFM Education as a Treatment for Post Prostatectomy Incontinence –Review of Ten Intervention Studies of Men with Post Prostatectomy Incontinence

	Length of contraction (seconds)	Length of relaxation (seconds)	Number of repetitions	Total contractions per day	Number of times per day	Strength of contraction (Maximum/ Submaximum)
Bales et al, 2000	5-10		10-15		4	
Florates et al, 2002	3-5	6-10	20-25	80-100	4	Submaximum (70%)
Franke et al, 1999			20	60	3	
Meaglia et al, 1990	3-10		17	51	3	
Moore et al,1999	5-10 20-30	10-20 20-30	12-20 8-10			Submaximum (65-75%)
Parekh et al, 2003			8			
Porru et al, 2001			15	45	3	
Filocamo et al, 2005	5	10	10	30	3	
VanKampen et al, 2000				90		
Willie et al,2003	5	15			2	

Note. Empty cells indicate there was no reported information in the study.

The most commonly reported component of the exercise protocols was *number of times per day* to perform PFM exercises ranging between 2 to 4 times, with 40% of the protocols reporting exercising 3 times a day. The least reported component was the

strength of contraction. Two studies Floratos et al. (2002) and Moore et al. (1999) both included sub maximum contractions in their PFM exercise protocol. Floratos et al. (2002) had PFM contractions performed at a sub maximal strength of 70% and Moore et al. specified using sub maximum contraction at 65-75% for endurance exercises.

Despite some studies reporting a relationship between pelvic floor muscle exercises and continence (Moore et al., 1999; Parekh et al., 2003) the principles of exercise prescription have not been consistently utilized in the design and performance of PFM retraining. The variation in the reported components of PFM exercise regimes in these reviewed studies may be due to the fact that there are no studies based on empirical evidence about the inclusion of all the components of exercise prescription in training PFM. Another important reason is that there is no specified gold standard for a protocol for PFM exercises. Miller and Sampselle (1994) advocate building up the PFM contractions to an advanced level of 10 seconds hold, 5 seconds at maximum intensity and 5 seconds at midlevel intensity in their Graduated Strength Training protocol designed for PFM training for women, but this protocol has not been trialed in men nor compared with other exercise protocols.

Principles of exercise prescription.

The four key principles that need to be considered when designing exercise protocols are: 1.) specificity of muscle training, 2.) overload principle for muscle training, 3.) individualizing exercise regimes, and 4.) reversibility of training effects.

Optimum goal achievement when training a muscle depends on how specific the training is in relation to the function of that muscle (Hoppeler & Fluck, 2002). Therefore the effectiveness in training is based on targeting a muscle group, taking into consideration the composition of the muscle fibres such as the ratio of Type I and Type II fibres. Consideration is also given to the contractile properties and endurance capacity of the muscle fibres in order to increase its performance for a specific need (Adhihetty, Irrcher, Joseph, Ljubicic, & Hood, 2003). The inherent function of the muscles, such as power versus postural can influence the specificity of training, and thus the type of contractions used: isotonic, isokinetic or isometric. The isolation of muscle during exercise activity is key to successful muscle re-education.

Overloading muscle at an adequate intensity and duration is required in order to increase strength within specific muscle(s). Skeletal muscle is capable of adapting to repetitive episodes of contractions that occur during exercise (Adhihetty et al., 2003). This adaptability is specific and depends on the type of exercise training: strength or endurance. When training for strength, the frequency, intensity and duration of exercise are prescribed in various combinations, with a higher focus on the intensity of the exercise to promote muscle hypertrophy. When training a muscle for endurance, a lower level of intensity but a higher level of frequency and duration is prescribed. The low intensity and high frequency taxes the cardiovascular system more aerobically this makes it possible for muscles to work over longer periods of time and increase its functional endurance.

Regardless of the type of exercise training regimen used, the muscles being trained must develop tension to the point of overload in order to build strength. Progressive resistance exercises stimulate continued adaptation, leading to muscle hypertrophy and increased muscle strength (Kraemer & Ratamess, 2004). Studies (Fahey, 1998; Kraemer & Ratamess, 2004) have found 4-8 repetitions of resisted exercises performed in 3 or more sets to be the ideal to apply the principles of overload to strength training.

Individualization of exercise regimes is based on the frequency, intensity and type of muscle activity that the muscle needs to perform. In order to select an appropriate exercise regime it is necessary to complete a needs analysis based on the individual goals and the purpose for exercising (Kraemer & Ratamess, 2004). The exercise protocol should then be designed with the following information: training frequency, time constraints that may affect the duration of workout, muscle groups to be trained, types of muscle action such as concentric, eccentric, isometric, and the activity for which the exercise is designed.

Reversibility relates to the detraining effect that occurs when regular muscle overload is removed (Tucci, Carpenter, Pollock, Graves, & Leggett, 1992). Continuing to work the muscle at a maintenance level once optimum strength has been achieved can slow the rate of decrease of training effects (Tucci et al., 1992). Reduced level of exercise will continue to keep achieved level of strength and function in a muscle for up to 18 weeks once intensive strengthening has been stopped.

Summary

Post prostatectomy incontinence is a complication of prostatectomy affecting up to 88% of men immediately following removal of their catheter after 7-15 days. Although most regain continence there are still up to 31.7% (Sebesta et al., 2002; Stanford et al., 2000) that remain incontinent one year post operatively. PFM exercises may contribute to re-gaining continence in patients with post prostatectomy incontinence. In spite of the positive outcomes achieved with PFM exercise treatment regimens, there is inconsistency and lack of detail among the PFM exercise protocols cited in the literature. Additionally the theoretical or physiological basis for PFM exercise prescription is unclear.

2.2 The Use of Surveys as a Method for Data Collection

Survey design.

Survey research is defined as the use of a systematic method to gather opinions or factual information directly from a sample of individuals that represent a defined population (Hackett, 1981). The method of collecting information involves asking a pre-determined set of questions in a pre-determined sequence of a structured questionnaire. Surveys are one of the most commonly used methods of data collection both within and outside the social science community. The data collected tend to be related to facts, knowledge, attitudes, beliefs, experiences and behaviors within a population (Calder, 1998). It provides the option of generalizing findings to a larger population or to describe a specific group (Calder, 1998).

The characteristics of a survey lend itself to collecting information about a specific topic amongst a population with some knowledge or opinion about the topic (Shi, 1997). There are three characteristics to a survey including use of: 1) a large and randomly chosen sample size; 2) a systematic instrument to gather data; and 3) quantitative data analysis (Shi, 1997).

The first characteristic of a survey is use of a large randomly selected sample (Neutens & Rubinson, 1997). Survey findings will be more representative of the population based on the size, representation and responses given by the potential participants (Portney & Watkins, 2000). In random sampling all members of a population have an equal and known chance of being selected without bias (Portney & Watkins, 2000). It is the purest form of probability sampling and with a small population it is possible to list all persons in that population and hence achieve a more accurate representation of that population. However, with a larger population base it is difficult to identify each member and a smaller number is selected to represent the whole population to be studied. Although random sampling is preferable, this type of sampling technique is not always feasible and other methods may have to be used. In non-random sampling members of a population do not have an equal chance of being included in the sample chosen. With the likelihood that a person will be chosen and the sampling errors both unknown, the ability to generalize findings beyond that of the actual sample becomes limited (Portney & Watkins, 2000). One of the advantages of non-random sampling over random sampling is that it is a relatively simple and low cost means of surveying a population. However a major disadvantage of non random sampling is the inability to generalize the findings to a population, particularly if the objective of the study is to be

able to compare sample findings with the general population being studied. (Calder, 1998).

The second characteristic of a survey is the use of a standard instrument (Neutens & Rubinson, 1997), which facilitates standardized methods and participants' responses. The standardization is necessary to enhance reliability of the data collected and to minimize measurement and interpretation errors (Shi, 1997). The use of standard pre-determined questions will facilitate streamlined responses from participants that will enable comparison of responses between respondents.

The third characteristic of a survey is the use of quantitative analysis to report findings. The quantitative data analysis techniques used are based on whether the purpose of the survey is descriptive or exploratory. Descriptive research methods provide more details and understanding of the characteristics of a subject matter, and form a basis for further experimental research. Surveys tend to be of a descriptive nature. In a descriptive survey design one or more elements of research questions such as, what, who, where, and when (Calder, 1998) can be analyzed in a cross-sectional or longitudinal design. Cross-sectional analysis gives information at a particular point in time and is therefore cheaper and takes less time to complete the data collection. A questionnaire that collects information about current practice patterns and attitudes about current practices and analyzes these reported practices and attitudes does so with cross-sectional analysis. Longitudinal analysis gives a sense of change over time, and data collection tends to be more extensive and time consuming.

Exploratory research is conducted when little is known about a subject and is often conducted to initially gather information about characteristics important to a subject matter. Analysis in exploratory research is essentially abstraction and generalization. Abstraction is to translate the empirical observations, measurements into concepts (Routio, 2007). While generalization arranges the material so that it disengages from single persons, occurrences etc. and focus on those structures that are common to all or most of the subjects in the population of interest.

Use of surveys to investigate practice patterns.

Increased desire for evidence based practice in health care has increased the use of research surveys into clinical practice to explore and compile data about physiotherapy practice in the field in various areas of practice (Neutens & Rubinson, 1997).

Practice patterns and in some cases practice guidelines are developed through survey of practitioners or experts in specific areas of interest or practice. The value of a survey lies in its ability to form the foundation for future research and to describe current practice norms (Portney & Watkins, 2000). Practice guidelines assist physiotherapists and other practitioners to make decisions about the most appropriate and effective care for their patients.

There is evidence of the use of survey methodology to determine practice patterns within physiotherapy. Based on the results of a survey of 324 physiotherapists with a 51% response rate evidence based clinical practice guidelines for shoulder pain were developed (The Philadelphia Panel, 2001). Hurley et al 2002 used an 82-item

questionnaire to survey 150 physiotherapists on the practice of cervical spine manipulation (CSM) and achieved a 79% response rate. This study reported minimal practice variation in the application of CSM among the clinicians surveyed, but the results identified the need for an evidence based CSM clinical practice guideline. In another study, 785 physiotherapists were surveyed to explore their approaches to the management of low back pain (Li & Bombardier, 2001). Forty-six percent of the physiotherapists surveyed agreed that practice guidelines were useful in the management of lumbar impairment. This study patterned its questionnaire on one used to survey physicians in Ontario on management of acute low back pain and reported a 72.5% return. Frawley, (2005) surveyed physiotherapists about the clinical practice for pre and post operative pelvic surgery and found that there was no standardized patient care practice. The findings lead to further research to rectify and bring about change to the outcomes.

Questionnaire development.

Use of questionnaires in research is based on the underlying assumption that the respondent is willing and able to give truthful answers to each individual question (Berdie, Anderson, & Niebuhr, 1986). This is likely to happen if the topic and questions are interesting and relevant, and judged to be important to the respondent. One of the key factors in questionnaire design is relating questions to the objectives and guiding questions of the study, and stating clearly the purpose of the questionnaire and type of

information sought from it (Fowler, 2002). The other factor to consider in questionnaire design is the type and structure of the questions.

Questions are generally closed ended, open ended or a combination of the two. Closed ended questions are characterized by having 'yes' or 'no' response option or by selecting one of a given number of responses (Neutens & Rubinson, 1997). The advantages to close ended questions are: 1. they appear easy and quick to complete; 2. it is easier to standardize, code and analyze; 3. respondents are more likely to answer sensitive questions; 4. responses are usually clear and complete with less opportunity for irrelevant responses; 5. participants do not have to think up an answer; 6. socially less desirable questions can be included and 7. they are suitable for self-completion or with assistance from researcher (Boynton, May 2004; Neutens & Rubinson, 1997). There are however a number of disadvantages such as: 1. respondents may randomly select or guess the answer if unknowledgeable about the topic; 2. variation amongst respondents will be lower as there are fewer response categories to choose from for their responses; 3. questionnaire may be long if there are too many answer categories; 4. participants cannot expand on their responses or offer alternative views; and 5. respondents may make errors and circle or mark an answer they did not intend to (Boynton, May 2004; Neutens & Rubinson, 1997).

There are two basic concepts to consider when constructing a questionnaire with close-ended questions. Firstly the responses should include all possible response choices that can be expected, and a category for "not applicable", "don't know" and "other (please specify____)" should be included in the list of options. Secondly, each response choice should clearly represent a specific answer (Portney & Watkins, 2000). Close-

ended questions have several categories of response formats. The simplest presents the respondent with two choices of response or a dichotomous response. This format presents an easy and quick response, however it does not allow for any personal opinions. The most commonly and frequently used format is multiple choice, either single response questions where the respondent selects one response from a given list or multiple response questions where respondents select all relevant responses applicable to their situation. Although multiple response questions provide the respondent with more options each response must be mutually exclusive in its idea and meaning. Other response format options include ranking or rating, fixed sum scales and Likert scales. These all pose various challenges to the respondents such as relativity, resources and time allocated to each response and grading the level of agreement or disagreement of the question statement.

By contrast, open ended questions have unspecified categories, and the respondent is allowed to use their own words to answer the questions. Open ended questions tend to probe into respondents' feelings and opinions. This format allows information gathering when: 1.there are no known response categories; 2. the topic is of a controversial, sensitive and complex nature; and 3. the researcher wishes the respondent to provide creative, clear and detailed answers (Neutens & Rubinson, 1997). The disadvantages are: 1. difficulty coding and analyzing the responses; 2. higher demand of the respondent's time, thought and writing ability; 3. difficulty understanding and answering questions that are too general; and 4. irrelevant responses to the objectives of the study. Most questionnaires mainly consist of close ended questions with few open ended questions.

In designing questions for questionnaires there are two factors to consider, the technical aspect and the ethical issues of the questions (Calder, 1998; Woodward & Chambers, 1980). Technical aspects to be included are design, format, face and font, the paper color, the layout of the questions, inclusion of tick boxes for responses, and the length of the questionnaire. Attention to these technical aspects will make it more likely that the questionnaire will be completed (Woodward & Chambers, 1980). Ethical concerns include how personal the questions are and the threat to the respondents. Therefore questionnaires have to take into account the technical and ethical issues that may cause the respondents any anxiety or distress, and must be designed to create anonymity, convey confidentiality to the respondents, and address the research question or objectives.

Pre-testing questions.

Validity is the extent to which a measure represents all facets of a given social concept and the degree in which a measuring device truly measures what it intends to. The validity of a questionnaire makes certain that the purpose and objectives of the study are met. The content validity is established by pre testing the questions in a questionnaire (Boynton, 2004), as well as the type of questions asked and the relevance and comprehension of the questions to the population being studied. Properly phrased and administered questions evoke a more honest and non personal response (Berdie et al., 1986). Pre testing questions is done to establish content validity (Hurley et al., 2002; Simons, King, Edgar, & Anzba, 2003). Pre testing is usually conducted among a small

number of respondents who closely resemble the population to be sampled (Shi, 1997), or who have expertise and knowledge on the topic to be studied. Their responses and feedback is used to help clarify the wording of the questions, add or remove items or categories of questions and to make further revisions to the questions. Content validity is established concurrently with reliability both of which contribute to the strength and appropriateness of the questionnaire and the data collected from it.

Reliability is the consistency of measurement, or the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects. Reliability of the questionnaire is established by making sure that each item consistently conveys the same meaning to each member of the population being surveyed (Berdie et al., 1986), and is also achieved by pre-testing the questions. Reliability is further achieved by standardizing the questions such that all participants are asked the same questions in a consistent format and the responses are recorded in a uniform manner (Boynton, 2004). When the reliability of a questionnaire is deemed present one can expect to have consistent and dependable responses.

Methods of data collection for surveys

Methods used for data collection include: a) mail survey; b) telephone interview; c) face to face personal interviews including observation of behavior and attitudes; and d) computerized self-administered questionnaire (CSAQ) by electronic mail or a web-site.

Mail surveys are more frequently used than telephone and face to face interviews (Dillman, 1991). Mail surveys provide the researcher with the opportunity to personalize the recruitment of participants by including a personally signed cover letter. It also gives better anonymity as there is no direct contact with the participant, eliminates bias from an interviewer, and allows access to a larger population as it is quick and easy to distribute. In addition, mail surveys are relatively inexpensive compared with telephone or face to face interview surveys (Dillman, 1991; Boynton, 2004). However with mail surveys there are disadvantages such as lag time for mail delivery, lost mail, cost for materials and postage, inability to use complex question format or address very personal issues and risk of questionnaire returned with unanswered questions. Follow up is also done by mail again running the risk of undelivered mail and participants misplacing or losing the questionnaire. Mail surveys also have a notoriously low response rate because the researcher is relying on the goodwill and co-operation of the participants to complete and return the questionnaire (Dillman, 1991; Boynton, 2004)

The advantages of telephone survey includes; personalization of the survey, higher response rates, control of the order in which questions are answered, and ability to use more complex and involved questions. Telephone surveys are also quick and easy to complete and relatively inexpensive. The disadvantages include; only small sample sizes would be feasible to manage, questions may cease to be standardized if repeated or probing is needed to clarify the question. Further disadvantages with telephone surveys include the inability to control for participant refusal to participate, unsuitable for those

with hearing problems, and laborious if the participant wants to talk more than required (Dillman, 1991; Boynton, 2004).

Face to face survey also has the advantages of personalization of the survey, control of the order in which questions are answered, observation of verbal and nonverbal responses and ability to use more complex and involved questions. The disadvantages include the high cost involved in performing face to face interviews, only small sample sizes would be feasible to manage, questions that may cease to be standardized if repeated or probing is needed to clarify the question.

The use of electronic surveys has increased with increased accessibility to the Internet within the general population in both urban and rural areas (Kiel, 2005). Shannon (2002) reported on the frequent use and high level of confidence of professionals in using e-mail and the internet, with 90% using email daily and 78% using internet five days a week. This has made it possible to reach a larger population base and thus potentially increase sample size (Read, 2004). Other advantages are that electronic survey questionnaires are easy to design and send out, and responses can be tracked and reminders sent to non respondents. Moreover, there is good opportunity for qualitative feedback (Boynton, June 2004). Although there is little difference in the quality of data collection between postal and electronic surveys the speed of response is significantly higher in electronic surveys (Mavis & Brocato, 1998).

A disadvantage though is that the sample accessed via electronic mail may not typically represent the general population (Shannon, Johnson, Searcy, & Lott, 2002). Other considerations are the technological capability with relation to respondent's skill

and knowledge for downloading and responding to electronic questionnaires (Shannon et al., 2002; Boynton, June 2004). However the minimal costs associated with electronic surveys makes it a favorable method of data collection. Although there is extensive literature (Fox, Crask, & Kim, 1988; Gore-Felton, Koopman, Bridges, Thoresen, & Spiegel, 2002) about principles of survey design and factors that influence response to mail and telephone surveys, as discussed below, it is not clear if these factors are applicable to electronic surveys. Shannon's (2002) study on the perception and recommendations of experienced researchers regarding the use of electronic surveys reported that researchers must incorporate principles of sound survey design in designing web based surveys. These principles must be adaptable for electronic survey formats in order to maintain the integrity of the data collected, and the confidentiality and privacy of respondents.

Response rate.

Response rate is a significant indicator of the confidence placed on the results of a survey. A low response rate can significantly affect the generalizability of a study. Increasing the response rate will subsequently increase the sample size which will improve statistical power, reduce sampling error and increase the ability to generalize to the larger population (Gore-Felton et al., 2002). If the characteristics of the respondents are similar to that of the larger target population group then the findings can be assumed to be representative of the wider population sampled based on the relatively high response rate. Factors reported by Fox (1988) which were considered to influence

response rate were: prenotification of the survey, follow-ups, prepaid first class return postage, monetary incentives, university sponsorship, and color of the questionnaire paper.

Gore-Felton et al. (2002) examined the treatment decisions of psychologists in cases of childhood sexual abuse and designed their mail out survey to facilitate a high response rate. The response rate of 68% was increased with use of first class postage and follow up cards sent after two weeks and a questionnaire sent after five weeks to non respondents. The cover letter was printed on laser white paper and the questionnaire was in booklet form printed on blue paper. In a study conducted by Sebesta et al. (2002) using a mail out questionnaire to evaluate urinary incontinence and satisfaction after radical prostatectomy a 78% response was reported. However, the reasons for the high response rate were not reported.

In reviewing the literature on response rates for mail surveys of physiotherapists' practice patterns in various areas of practice, high response rates of 79% (Hurley et al., 2002) 72% (Li & Bombardier, 2001) and 75.9% (Frawley, Galea, & Phillips, 2005) were reported. The high response rates reported may have been achieved by pre testing of questionnaire to make questions relevant to the study topic follow up by mail three weeks post mail out (Hurley et al., 2002; Li & Bombardier, 2001) and telephone follow up to five months post initial mail out. These strategies were reported by all three studies.

Differences between respondents and non respondents of surveys can be attributed to decreased interest and involvement in the survey subject, decreased level of education and other factors such as age, gender, ethnicity, marital status, poor health and

socioeconomic status (Berdie et al., 1986). The factors mentioned above may affect the ability to generalize findings to a larger population. A comparative study of respondents of Internet, mail and computer assisted telephone interview [CATI] (Link & Mokdad, 2005) reported a response rate of 15% for web mail, 44% for mail and 40% for CATI. Respondents in the over 65 age group were the highest amongst mail respondents, and respondents who had attended college were highest for web respondents. Response rates for electronic surveys have been reported at 51% (Read, 2004)

Follow up techniques for non respondents will vary depending on the survey mode. Although response rate is reported to increase with follow up reminders the literature does not indicate when or how often to send out follow up reminders. Response rate may increase by 20-30% with follow up reminders (Calder, 1998). Mail questionnaires are generally coded so non respondents can be identified and followed up. This is not possible with web based questionnaires.

Summary

When little is known about a specific topic the use of surveys is a widely used data collection method for research. Options of using questionnaires were well documented as well as the various options for distribution of questionnaires. The use of electronic surveys achieves the same results in the data collection within a shorter time frame. In spite of possible lower response rates compared to other methods of data collection the convenience and lower costs associated with electronic surveys makes it a favorable option. Surveys examining the practice patterns amongst physiotherapists in

various areas of practice have provided researchers with data that has enabled them to develop and test practice guidelines. On review of the literature there was no existing survey using a questionnaire to gather information regarding PFM exercise programs for patients with post prostatectomy incontinence.

Survey Objectives

1) To gather information about type, duration, frequency and progression of post prostatectomy PFM exercises used by physiotherapists and describe the findings;

2) To compare the findings from the survey with what is reported in the literature with particular attention to the number of repetitions per set and total numbers of contractions patients are to perform in a day;

3) To determine what client, therapist, environmental and socioeconomic related factors influence the total number of treatment sessions patients receive in their treatment program.

Chapter Three

Method

3.1 Introduction

This descriptive study was designed to determine the similarities and differences among physiotherapists and the literature findings with respect to the application of PFM exercise protocols for treatment of post prostatectomy incontinence. The following questions were addressed a) what PFM exercise protocols do physiotherapists use in their treatment programs for men with post prostatectomy incontinence, b) how do physiotherapists adjust and progress PFM exercise protocols, c) what are the factors that influence choice of PFM exercise protocols and d) how do the study results compare to the literature findings on PFM exercise protocols?

3.2 Design

The proposed study used a cross-sectional descriptive design incorporating survey methods using a questionnaire developed specifically for this study.

The aim of the proposed study was to collect information from physiotherapists across Canada about their current practice with regard to PFM exercises in patients with post prostatectomy incontinence.

3.3 Sample

The population consisted of the 9,800 physiotherapists registered with the Canadian Physiotherapy Association (CPA). The desired target sample was physiotherapists who treat men with post prostatectomy incontinence. The CPA includes a Women's Health Division (WHD) of 340 members and most physiotherapists who treat men with post prostatectomy incontinence are members of this division, thus providing the target sample. The CPA was contacted for a list of the names of registered physiotherapists in the WHD, information which can be accessed by members at no cost from the WHD. As membership in the CPA is not mandatory the target sample was enhanced by including physiotherapists from the attendance list of a course *The Rise and Fall of the Pelvic Floor* held in Calgary, Alberta from April 15, 2005 to April 17, 2005, that was attended by the principal investigator. The attendance list and contact information was printed in the program and made available to all course participants. Physiotherapists from the course attendance list were cross referenced with those of the members of the WHD to avoid duplication of target sample individuals. All course participants were also members of WHD. The final target sample was 340 physiotherapists. The target sample included physiotherapists working in rural and urban areas and in private practice, hospitals, health centers and long term care facilities.

Recruitment was completed by using non-randomized convenience sampling. With a target sample of 340 physiotherapists in Canada, non random sampling was the

most convenient, least expensive and least time consuming method to select the study sample.

Recruitment to the study occurred by way of an email invitation sent to all members of the WHD. See Appendix A for e-mail letter of invitation sent out to the potential participants. Because the questionnaire was distributed electronically by the CPA anyone on the registration list without an email address was not included in the sample.

All physiotherapists who treated at least one post prostatectomy patient for incontinence within the 6 month period prior to the distribution of the questionnaire were eligible for inclusion in the study. This time frame gave reasonably current practices of the physiotherapists surveyed and facilitated the ability of the physiotherapists to recall relevant information.

3.4 Development of the Questionnaire

A 27 item questionnaire designed to determine current protocols used by physiotherapists treating post prostatectomy incontinence was developed based on the components of PFM exercise protocols discussed in the literature review. See Appendix B for survey questionnaire. It includes questions on the type, duration, frequency, and progression of exercises, as well as the number of treatments received and factors affecting the number of treatments. Questions also address the physiotherapists' level of

experience and their caseload. The majority of the questions were close ended with between 2-5 categories. Two open ended questions were also included.

The questionnaire was organized in four sections that addressed the objectives of the study. The first objective was to gather information about PFM exercise protocols currently used by physiotherapists treating post prostatectomy incontinence. This objective was addressed in sections A and B of the questionnaire. Section A focused on the most common type of PFM muscle contraction such as strength, endurance and quick contraction. Each type of contraction was further qualified with questions on the length of hold and relaxation of the contraction and the degree of strength used to hold the contraction. Section B dealt with further details of the exercise protocol relating to frequency and progression of PFM exercises.

The second objective was to determine similarities and differences in the number of repetitions and contractions performed a day as reported by physiotherapists completing the survey in comparison to those reported in the literature. This objective was addressed in Section B of the questionnaire.

The third objective was to determine external factors that affected the number of treatment sessions. This objective was addressed in Section C and focuses on information about factors affecting the attendance and number of treatments patients receive in their treatment program. The question on factors affecting number of treatments was open-ended. Responses to this question were grouped into client, therapist, socioeconomic and environmental factors. This data gave some insight into reasons why patients may not be able to pursue a PFM exercise treatment program.

Demographic characteristics of the sample were obtained in Section D. This section collected information about the experience and acquired knowledge of the physiotherapists and provided information about the physiotherapy population responding to the survey and helped facilitate the interpretation of the results.

Testing the questionnaire

Content validity was established by expert review as per (Frawley et al., 2005; Simons et al., 2003). Three physiotherapists, known to the principal investigator, who have extensive experience working with patients with post prostatectomy urinary incontinence, reviewed the questionnaire. These physiotherapists were excluded from the final study sample to reduce any potential subject bias. Each expert physiotherapist was sent a letter of request to participate as an expert reviewer (Appendix C) and telephoned prior to receiving the questionnaire to request their participation and to assess their willingness to assist. These physiotherapists were then provided with an explanation of the study and instructions on reviewing the questionnaire (Appendix D). A postage paid envelope was provided for return of the completed questionnaire and feedback within one week of receiving the questionnaire. The questionnaire was sent to the 3 physiotherapists with instructions to complete the questionnaire and then provide feedback about the content of the questionnaire using the guideline of specific questions provided. See Appendix E for feedback guidelines for expert reviewers. Two of the physiotherapists were telephoned as the questionnaire and feedback information had not been returned within the specified time.

The principal investigator met with one reviewer face to face, and the other two via telephone following the return of the questionnaire. Each question was evaluated for content validity. Guided by the initial responses, content validity was further evaluated through discussion of the following questions with the physiotherapists: does the questionnaire address the domain of interest? are the questions appropriate and suitable to be included within the context of the objectives of the study? and should any questions be added or deleted?

The expert reviewers then assessed the reliability of the questions through review of the following: consistency of language use, the interpretation of the question and responses, and the clarity of the questions (Calder, 1998; Woodward & Chambers, 1980). These topics were addressed with the expert reviewers through the questions in Appendix E and discussions during the face-to-face meeting with one reviewer and telephone discussion with the other two reviewers. Questions were revised, deleted, or added based on the following criteria: a) the context of a question did not change and b) 2 of the 3 reviewers agreed on a question revision, addition or removal. The finalized questionnaire was formatted by the principal investigator using survey monkey, a web based program for which the principal investigator has a registered account. The final formatted survey was emailed via link to survey monkey to the expert reviewers to be re-tested for ease and accuracy of completion.

Results of testing the questionnaire.

The following were the responses of 3 expert physiotherapists who responded to the questions about the content and validity of the questions included in the study questionnaire.

In response to the question on length of time taken to complete the questionnaire, two reviewers took 30 minutes, and one took 20 minutes to complete the questionnaire.

All three reviewers responded that there were no questions in Section A, B or C of the questionnaire that did not reflect components of PFM exercises or that should be revised or excluded. There were no additional questions about PFM exercises indicated by the reviewers that should have been included in the questionnaire. No reviewers found the questions to be ambiguous or difficult to understand, nor were any of the response options unclear. There was no further feedback following completion of the electronic questionnaire.

3.5 Procedure for Questionnaire Distribution

Survey monkey, a web based mail out program that focuses on the use of surveys in research, was used to distribute the questionnaire through the CPA. Survey monkey is a software program used to format and distribute questionnaires and is subscribed to and used by the CPA for membership surveys. Due to privacy laws regarding web mail the CPA does not release members' email addresses. Once ethical approval was received

from Health Research Ethics Board (HREB), University of Alberta, the CPA was provided with the ethics approval letter. A summary of the proposed study, a draft of the questionnaire and the introductory email (Appendix A) which is a letter of invitation for the participants to take part in the study were submitted to the Chair of the WHD for review and approval. This was required in order to have the CPA agree to distribute the research questionnaire to the target sample by way of an e-blast with a link to the questionnaire. The electronic mail method of distribution was chosen in order to access the larger target sample of 340 physiotherapists. The target population was part of a professional group that was likely to have computer access.

The letter of invitation together with a link to the final copy of the questionnaire was emailed to Sheila Lennon at (slennon@physiotherapy.ca) the contact person at the CPA. The letter of invitation emailed with the questionnaire gave a brief description of the study and the importance of the role each respondent would have on the final outcomes of the study. The letter of invitation provided instructions for completing the questionnaire. Specific instructions were given requesting that only physiotherapists treating post prostatectomy patients with incontinence using PFM exercises complete the questionnaire (Appendix B) and return it electronically.

The letter of invitation (Appendix A) gave specific instructions to the physiotherapists who met the inclusion criteria on how to follow links to the website where the questionnaire was located at (www.surveymonkey.com). Once the link was accessed instructions on how to complete the questionnaire and submit it was given. All

questions on the questionnaire had to be answered in order to be included in the analysis. The questionnaire could not be sent if all questions were not answered.

An initial reminder was emailed out by CPA two weeks after the original questionnaire had been sent out, and a second reminder was sent after four weeks. See Appendix F for reminder e-mail.

3.6 Ethics and Confidentiality

Ethical approval for this study was obtained from HREB, University of Alberta. Participants were informed of the measures taken to ensure confidentiality and anonymity of the responses and the respondents. The principal investigator maintained confidentiality by having all the responses to the questionnaire stored on survey monkey data base. Survey monkey has SSL encryption which is a world-wide standard for encrypting information that travels over the internet. The survey and responses were sent over a secure encrypted connection and thus ensured confidentiality of the data. The researcher was registered with survey monkey and had secured access to the responses on survey monkey.

Completion and return of the questionnaire constituted participants consent to collect the data and use the results of the survey for publication. A contact email address and telephone number was given for participants to use if they had questions or required clarification of the process or about the questionnaire.

3.7 Data Analysis

Only data obtained from physiotherapists who treated men with post prostatectomy incontinence in the six month period prior to completing the questionnaire were included in the analysis. The data was compiled on the survey monkey program. Descriptive statistics were presented using frequency tables and narration.

Chapter Four

Results

Three hundred and forty physiotherapists working in Canada and members of the Women's Health Division of the Canadian Physiotherapy Association were surveyed via an electronic survey. The WHD consists mainly of physiotherapists working with obstetrical and gynecological patients with a few including men in their caseloads. The three expert reviewers were included in the e-blast from CPA but did not participate in the survey. Thirty-five surveys were completed and returned resulting in 10 % response rate. Timely response occurred with thirty-two participants who returned completed questionnaires within two weeks of being sent out. Two follow up reminders were sent however only three respondents sent in their questionnaires after the second reminder.

Six of the 35 respondents indicated they did not treat post prostatectomy incontinence and were therefore excluded from the analysis. Twenty-nine participants responded yes to treating men with post prostatectomy incontinence and 23 (79%) out of these 29 responded to the questions on the survey and could be included in the analysis. Although the number of respondents 29 out of the 340 sampled is low the actual number of members in the WHD who treat men for post prostatectomy incontinence is unknown. Members in the WHD however are mainly involved in the following areas of practice: pre and post natal, pelvic floor conditions such as pelvic pain, bladder and bowel dysfunctions, post gynecological surgeries and other related conditions in women. There

is no specific registry of physiotherapists who treat incontinent men, therefore this study could not draw its sample solely from that population.

The initial intent was to re-format the survey data from a raw Excel file to SPSS version 14 for analysis. Use of SPSS 14.0 to analyze the data posed a problem as the program cannot compute data entered as a range of minimum and maximum scores.

Responses to several of the study questions were given in ranges for example length of hold of strength contractions ranged from minimum of 2-3 seconds to a maximum of 8-10 seconds, number of speed contractions yielded responses of 3-5 seconds, 6-10 seconds and 10-20 seconds. The variation between the ranges made it difficult to group the responses into evenly distributed ranges that would capture all of the response ranges given in order to record the frequency of responses. Therefore for each study question, most logical ranges were developed and all responses were put under most appropriate category when calculating frequency of responses. For example, for strength contractions, the response was varied for the duration of hold for contractions. The responses were categorized into five most logical categories: "$\leq$5 seconds"; ">5 to $\leq$10 seconds; "> 10 seconds"; "No definite time"; and "No Response". Then responses such as "start 2-3 seconds, goal 10 seconds", "depends on the patient's assessment, usually start with 3-5 seconds hold and progress up to 10 seconds", "Up to 10 seconds, starting point dependent on their presentation" were included in most appropriate category i.e. 5 to 10 seconds. After the analysis of survey data was completed, the results were organized and the frequencies were reported in table format.

4.1 Demographic Information

A demographic summary of the survey respondents is provided in Tables 2-4. More than 50% of the respondents had been practicing physical therapy for over 15 years however majority had been treating men with post prostatectomy incontinence for ≤ 10 years.

Table 2

How long have you been practicing Physiotherapy?

Number of years	Frequency (%) N=23
1-≤5	1 (4)
>5-≤10	2 (9)
>10-≤15	3 (13)
>15-≤20	3 (13)
>20-≤25	4 (18)
>25-≤30	3 (13)
>30-≤35	1 (4)
>35-≤40	1 (4)
No response	5 (22)

Table 3

How long have you been treating men with post prostatectomy incontinence?

Number of years	Frequency (%) N=23
< one year	1 (4)
>1-≤5	7 (30)
>5- ≤10	7 (30)
>10-≤15	2 (9)
>15 ≤20	1 (4)
No response	5 (22)

Five (21%) respondents did not provide responses to questions on the number of years of physiotherapy practice and the number of years of experience in treating post prostatectomy incontinence.

The following Table 4 provides information on the number of post prostatectomy patients treated in a month by the physiotherapists.

Table 4

How many patients with post prostatectomy incontinence do you see per month?

Number of patients	Frequency (%) N=23
1-≤5	17 (74)
>5-≤10	1 (4)
>10-≤15	2 (9)
No Response	3 (13)

The number of patients treated in a month was low at 5 or less for majority of the respondents.

Report on the level of education and province of practice.

Fourteen (60%) reported BSc PT to be their highest level of education, with 2 (8%) reporting diploma in physiotherapy and 2 (8%) having an MSc PT as their highest level of education.

The majority of physiotherapists in our sample were from western Canada with 34% from British Columbia, and 9% from Alberta. Other provinces represented were Ontario with 9% of the sample and Saskatchewan, Manitoba, Quebec Nova Scotia and Prince Edward Island each with one participant.

Report on sources of knowledge and practice skills.

Table 5

How did you acquire knowledge and practice skills to treat post prostatectomy incontinence?

Sources	Frequency (%) N=23
Courses	17 (74)
Conferences	10 (43)
Colleagues	9 (39)
Publications	8 (35)

Table 5 displays responses to the question, 'how did you acquire knowledge and practice skills to treat post prostatectomy incontinence?" All respondents cited more than one source in their response. Four respondents used all four sources to acquire

practice skills and knowledge. Nine respondents indicated they used at least three of the four source options and four respondents reported courses as their only source of acquiring practice skills. The most frequently reported publications used to acquire knowledge and practice skill were journals. This question did not ask for specific publications. Several respondents also used textbooks and research articles as other means of acquiring practice knowledge.

Table 6

What sources of evidence influence your practice in treating post prostatectomy incontinence?

Sources	Frequency (%) N=23
Journals	12 (52)
Courses	13 (56)
Conferences	9 (39)

Respondents reported using more than one source of evidence (Table 6). Urology journals were reported to be the most commonly used source of evidence influencing practice in Table 6. The following journals were cited; Neurourology & Urodynamics, Obstetrics and Gynecology, Physical Therapy, Physiotherapy, Urology Linx and Physiotherapy Canada. .

Did you receive any information about post prostatectomy incontinence in your entry level education?

Finally, upon questioning about entry level training, eighteen respondents stated they received no information or training on post prostatectomy incontinence during their entry level physiotherapy training. The remaining five respondents did not answer this question.

4.2 Objective 1

The first objective of the study was to gather information about type, duration, frequency and progression of post prostatectomy PFM exercises used by physiotherapists. The results for the type and duration of contractions included in the PFM exercise protocols are presented in the following frequency tables. All 23 (100%) respondents indicated they included strength and speed contractions in their protocols but only 21 (91.3%) included endurance contractions. All reported frequencies for endurance out of 21.

How long are contractions held and how long is the relaxation time after each contraction for strength and endurance contractions?

Strength contractions

The response was varied for the duration of hold for strength contractions. Responses have been categorized into five categories as shown in Table 7. Similarly,

the responses for the relaxation time after each strength contraction varied. These responses have also been categorized into five categories as shown in Table 7.

Table 7

The length of hold for contraction and relaxation time after each contraction for strength and endurance contractions

	Strength contractions N=23		**Endurance contractions N=21**	
	Contraction	Relaxation	Contraction	Relaxation
Seconds	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
≤ 5	5 (22)	3 (13)	1 (5)	1 (5)
>5-≤10	12 (52)	12 (52)	5 (24)	5 (24)
>10-≤20	2 (9)	5 (22)	4 (19)	5 (24)
> 30	0 (0)	0 (0)	6 (29)	6 (28)
No definite time	3 (13)	2 (9)	2 (9)	1 (5)
No response	1 (4)	1 (4)	3 (14)	3 (14)

Endurance contractions

For endurance contractions, the response was also varied for the duration of hold for contractions. These responses have been categorized into six categories as shown in Table 7. Four (66%) out of the 6 respondents in the >30 seconds hold category reported both length of contraction and relaxation to be for up to 60 seconds or more. Similarly, the responses for the rest time after each contraction for endurance contraction was also varied. These responses have also been categorized into six categories as shown in Table 7.

Table 8

At what strength are endurance contractions held (% of maximum)?

% of maximum	Frequency (%) N=21
0-25	1 (5)
26-50	6 (29)
51-75	4 (19)
76-100	7 (33)
No response	3 (14)

For endurance contractions (Table 8), four (66%) out of these 6 respondents in the 26-50 % category reported that they held contractions at 50 % of maximum strength. Three (42%) out of the 7 respondents in the 75-100 category reported holding contractions at 100% (maximum) strength.

Method of determining percentage of maximum for endurance contractions.

Nine (42%) out of 21 respondents reported using objective methods to determine the % of maximum strength, such as biofeedback, digital rectal examination, and EMG (electromyography). Six (26%) reported using subjective measures such as asking the patient to contract strongly and then relax slightly to determine the % of maximum strength. Six (26%) did not respond to this question.

Speed Contractions

How many repetitions in how many seconds?

Reporting on speed contractions varied in both the number of repetitions and the time in which the contractions occurred in. Three respondents (13%) reported performing 5 repetitions in up to 5 seconds. One respondent (4%) reported performing between 5-10 repetitions in 10 seconds. The majority of respondents 9 reported performing between 5-10 repetitions in >10 seconds, with 8 of these 9 respondents performing exactly 10 repetitions in 11 seconds. Three respondents (13%) reported 5-10 repetitions in an unspecified time frame, one respondent (4%) performed >10 repetitions in an unspecified time and one (4%) reported >10 repetitions in equal to or greater than 10 seconds. Three respondents (13%) had no specified number of repetitions and two (8%) did not respond to the question.

Combinations of contractions used for speed contractions.

In Table 9 the four different combinations of contraction and relaxation for speed contractions are reported.

Table 9

Which of the following combinations do you use for the speed contractions?

	Frequency	
Combinations for speed contractions	Yes (%)	No (%)
Max contraction partial relaxation	8 (35)	14 (61)
Max contraction full relaxation	20 (87)	3 (13)
Sub max contraction partial relaxation	4 (17)	17 (74)
Sub max contraction full relaxation	4 (17)	18 (78)

As shown in Table 9 87% of the respondents had their patients use a maximum contraction and full relaxation for their speed contraction exercises. More than one of the combinations were reported by respondents.

PFM exercise protocols relating to frequency and progression of exercises.

How do you determine initial contraction duration (hold)?

Twenty (87%) respondents reported that they determined initial contraction duration based on the length of time patient was able to hold contraction.

What is the maximum number of repetitions per set you instruct patients to perform?

Responses for number of repetitions per set were grouped into five categories as shown in Table 10. More specifically, 9 of the 12 respondents in the >5-≤10 instructed their patients to perform exactly 10 repetitions per set for strength contractions. Nine out of the 11 respondents in the >5-≤10 repetitions per set instructed their patients to perform exactly 10 repetitions per set for endurance contractions. Seven out of the 10 respondents in the speed category also instructed their patients to perform exactly 10 repetitions per set for speed contractions.

Table 10

What is the maximum number of repetitions per set you instruct patients to perform?

	Frequency (%)		
Repetitions per set	Strength N=23	Endurance N=21	Speed N=23
≤ 5	2 (9)	3 (14)	3 (14)
>5- ≤10	12 (52)	11 (52)	10 (43)
> 10	5 (22)	3 (14)	7 (30)
No definite number	1 (4)	2 (10)	0 (0)
No response	3 (13)	2 (10)	3 (13)

How often do you increase the number of repetitions for strength and endurance contractions?

The majority of responses in Table 11 for the frequency of increase in the number of repetitions per set for strength 9 (39%) and endurance 14 (67%) contractions was in the other category and was based on the patients ability, progression, and response and tolerance to performing PFM exercises.

Table 11

How often do you increase the number of repetitions for strength and endurance contractions?

Frequency of increase	Strength (%) N=23	Endurance (%) N=21
Daily	1 (4)	0 (0)
Weekly	8 (35)	4 (19)
Monthly	2 (9)	2 (9)
Other	9 (39)	14 (67)
No response	3 (13)	1 (5)

How many repetitions do you add when you progress your exercise protocol for strength and endurance contractions?

With reference to Table 12, responses in the other category for both strength and endurance were "depends on patient progress", "patient concerns and starting point of contractions" and "maintaining same number of repetitions and increasing the length of hold" The majority of respondents added 5 or less repetitions for both strength and endurance contractions.

Table 12

How many repetitions do you add when you progress your exercise protocol for strength and endurance contractions?

Number of repetitions	Strength (%) N=23	Endurance (%) N=21
≤ 5	12 (53)	10 (48)
>5-≤10	4 (17)	6 (28)
Other	4 (17)	4 (19)
No response	3 (13)	1 (5)

If the number of repetitions you add varies depending on patient response, what factors contribute to your decision regarding the number of repetitions you add?

Participants were asked about factors that contributed to their decision about the number of repetitions added to patients PFM exercises. The most frequently reported factors that contributed to the number of repetitions added were the strength and quality of PFM contraction. This was reported by seven of the 19 respondents who provided information to this question. Four indicated that degree of leakage and level of improvement affected the number of repetitions added to PFM exercises. Other factors reported were level of fatigue, compliance, ability to perform given number of repetitions and to maintain the contraction hold, technique, level of activity and comprehension of PFM exercises.

H*ow many times a day do you instruct your patients to perform PFM exercises?*

Ten (44%) respondents reported that they instructed their patients to perform PFM exercise more than 3 times a day (Table 13). They provided a variety of instructions related to the number of times per day to perform PFM: "every 2 hours", "10 or more times", "with ADL", "initially with every bathroom visit", depending on patients fatigue level" and five times decreasing to three".

Table 13

How many times a day do you instruct your patients to perform PFM exercises?

Number of times a day	Frequency (%) N=23
Once	1 (4)
Twice	2 (9)
Three	6 (26)
>3	10 (44)
No response	4 (17)

How many total contractions are your patients expected to perform each day?

Responses for total contractions patient expected to perform per day were divided into six categories as shown in Table 14.

Table 14

How many total contractions are your patients expected to perform each day?

Number of contractions	Frequency (%) N=23
≤ 30	6 (26)
30-60	7 (30)
60-90	2 (9)
> 90	4 (17)
No definite number or range	2 (9)
No response	2 (9)

When do you instruct patients to incorporate contractions with functional activities?

Various responses were received regarding when patients were asked to incorporate contractions with functional activities. Eight (35%) of the respondents reporting asked their patients to incorporate contractions with functional activities after initial assessment, and one (4%) at the end of treatment program. The majority of the respondents (48%) responded in the other category, and qualified their response with the following comments "when patient is able to perform a PFM contraction during function"; "midway through treatment session"; "after the second treatment session"; "depending on patients strength and compliance" and "as soon as possible". Nineteen (83%) respondents included strength contractions in functional activities including lifting, carrying, reaching, coughing, sneezing. Eighteen (78%) respondents included endurance contractions in functional activities including standing, walking, stair climbing, etc.

Nineteen (83%) respondents included speed contractions in functional activities including laughing, coughing, sneezing, etc.

4.3 Objective 2

The second objective was to determine similarities and differences between the findings from the survey and what is reported in the literature with particular attention to the number of repetitions and total number of contractions to perform a day.

Table 15 provides the comparison between the study findings and what is reported in the literature review with respect to the number of repetitions of contractions per set of PFM exercise. Comparison was made using the results in the study for strength contractions.

Table 15

Comparison between study findings and the literature with respect to the number of repetitions per set of PFM exercises

	Study (N=23)	Literature Review (N=10)
Number of repetitions per set	Frequency (%)	Frequency (%)
≤ 5	2 (9)	0 (0)
>5-≤ 10	12 (52)	2 (20) [1]
> 10	5 (22)	6 (60) [2]
No definite number given	1 (4)	0 (0)
No response	3 (13)	2 (20) [3]

References:
1 Parekh et al, 2003, Filocamo et al, 2005
2 Bales et al., 2000, Florates et al., 2002, Franke et al., 2000, Meaglia et al., 1990, Moore et al., 1999 and Porru et al., 2001
3 Van Kampen et al., 2000 and Wille et al., 2003

A marked difference was noted between the literature and the study findings in the number of repetitions per set of PFM exercises given. The majority of the studies in the literature instructed patients to perform more than 10 repetitions per set of PFM exercises where as majority of respondents in the survey gave between 5-10 repetitions per set.

Comparison of total number of contractions reported in the study findings with that in the literature review.

Table 16 demonstrates that our survey findings concur with the literature in terms of the number of contractions per day. The total numbers of contractions patients are instructed to perform in a day are reported in four categories.

Table 16

Comparison between study findings and the literature review with respect to the total number of contraction patients are instructed to perform in a day.

Total number of contractions	Study (N=23)	Literature Findings (N=10)
	Frequency (%)	Frequency (%)
≤ 30	5 (22)	1 (10) [1]
>30-≤60	8 (35)	3 (30) [2]
>60-≤90	1 (4)	1 (10) [3]
> 90	4 (17)	1 (10) [4]
No definite number/ range	2 (9)	0 (0)
No response / report	3 (13)	4 (40) [5]

Reference:
1. Filocamo et al., 2005
2 Franke et al., 2000, Meaglia et al., 1990 and Porru et al., 2001
3 Van Kampen et al., 2000
4 Florates et al., 2002
5 Bales et al., 2000, Moore et al., 1999, Parekh et al., 2003, and Wille et al., 2003

The majority of responses in both the study findings and the literature review reported the total number of contractions patients were instructed to perform to be between 30 and 60 contractions a day (Table 16).

Comparison of the number of times a day patients are instructed to perform PFM exercises reported in the study findings with that in the literature review

The final comparison made between the study findings and what is reported in the literature was the number of times a day patients were instructed to perform their PFM exercise program (Table 17).

Table 17

Comparison between study findings and the literature review with respect to the number of times a day patients are instructed to perform PFM exercises.

Number of times a day	Study (N=23) Frequency (%)	Literature Finding (N=10) Frequency (%)
Once	1 (4)	0
Twice	2 (9)	1 (10) [1]
Three	6 (26)	4 (40) [2]
> Three	10 (44)	2 (20) [3]
No Response	4 (17)	3 (30) [4]

Reference:
1 Wille et al., 2003
2 Franke et al., 2000, Meaglia et al., 1990, Porru et al., 2001 and Filocamo et al, 2005
3 Bales et al., 2000 and Florates et al., 2002
4 Moore et al., 1999, Parekh et al., 2003 and Van Kampen et al., 2000

Results in Table 17 shows a difference in the number of times patients are asked to exercise in a day between the study and literature review. Forty four percent of the study respondents report having patients perform PFM exercises more than 3 times a day, while 40% performed their exercises 3 times a day in the literature review.

4.4 Objective 3

The third objective was to determine client, therapist, environmental and socioeconomic factors that may influence the number of treatment sessions patients received. The numbers of days patients were seen a month and the number of treatment sessions patients receive in their treatment program are also reported in this section. The responses related to number of days patients were seen per month, and the number of treatment sessions was categorized into four categories as shown in Table 18. One respondent reported that they saw their patients 4-12 times a month for treatment. This response was not included in the responses in Table 18 as it straddled all three response categories.

Table 18

How often do you see patients for treatment per month and how many total treatment sessions do your patients receive?

Sessions	Days of treatment (per month) Frequency (%) N=23	Total Treatment sessions Frequency (%) N=23
1-5	17 (74)	11 (48)
>5-≤10	1 (4)	5 (22)
>10-≤15	1 (4)	4 (17)
No response	4 (18)	3 (13)

Are there any factors that affect the number of treatment sessions your patients receive? If so what are they?

This question was open ended and the factors affecting the number of treatment sessions were grouped in four categories and responses were allocated to the most appropriate and related category as shown in Table 19. The following fell under the *client related category* compliance, response to treatment, degree of dysfunction, motivation, age, perception of problem, PFM weakness, willingness to attend, social lifestyle, general condition and rate of improvement. Twenty- eight different client-related factors affecting treatment frequency were reported compared to one therapist related factor. The highest reported client related factor was compliance and rate of improvement, both factors were reported by six (21%) of the respondents. In the *therapist* related category, availability of a physiotherapist was the only related response. This was reported by one respondent.

In the *environmental category* two environmentally related factors were reported. Medical referral and travel distance were the most reported factors affecting treatments and were identified by six (26%) of the respondents.

The *socioeconomic category* had factors such as payment, insurance coverage and cost of treatments included. Three socioeconomic related factors affecting the number of treatments received were reported. The cost of treatment was reported by nine (39%) respondents as the factor that affected the number of treatments received the most.

Table 19

Factors that affect the number of treatment sessions your patients receive.

Categories	Number of factors	Frequency (%)
Client related factors	16	18 (78)
Socioeconomic related factors	3	9 (39)
Environmental related factors	2	6 (26)
Therapist related factors	1	1 (4)

Table 20 gives a break down of the different factors identified by respondents in the client related category that affected the number of treatments. The different factors are reported in a descending order of frequency.

Table 20

Client related factors that affect the number of treatment sessions patients received.

Client related factors	Frequency (%)
Compliance	6 (33)
Improvement and progress	6 (33)
Motivation	2 (11)
Age	2 (11)
General condition	2 (11)
Availability of client	2 (11)
Post-op PFM weakness	2 (11)
Patients goal	1 (5)
Willingness to attend	1 (5)
Pre-op PFM control	1 (5)
Perception of problem	1 (5)
Complaints of dysfunction	1 (5)
Patients lifestyle	1 (5)

The frequency reported reflects the fact that respondents identified more than one client related factor in their responses.

Chapter Five

Discussion and Conclusion

The purpose of this study was to gather information about type, duration, frequency, and progression of post prostatectomy PFM exercises used by physiotherapists. Survey results show that Canadian physiotherapists use all three main types of contractions in their PFM exercise protocols including strength, endurance, and speed contractions. All survey respondents indicated they included strength and speed contractions in their protocols and 91% indicated that they included endurance contractions.

Do you include strength contractions in your exercise protocols?

Strength contractions help to increase the strength of the pelvic floor muscles which in turn contributes to leakage control (Mathewson-Chapman, 1997). The basic principle of strength training is to perform a maximal contraction, hold it for a few seconds, then take a few seconds of rest and then repeat (Woolner, Corcos, & Drew, 1997). These hold-relax cycles are repeated several times, until the contraction begins to show fatigue, or when the patient begins to compensate with accessory musculature (Woolner, Corcos, & Drew, 1997). In the present study, it was evident that Canadian physiotherapists follow the basic principles of strength training but there is a variation in practices of physiotherapists with respect to duration of contraction, duration of relaxation between contractions, and maximum numbers of repetitions per set patients are instructed to perform. Despite the variation in strength training protocols, it is significant to note that over half the respondents (52%) reported duration of hold to be for 5 to 10

seconds; duration of relaxation after each contraction to be for 5 to 10 seconds; and 5-10 repetitions performed per set of PFM contractions. These figures correspond with recommendations for exercise prescription.

Do you include endurance training in your exercise protocol?

Endurance training is done with sub-maximal contractions held for increasingly longer periods of time (Woolner, Corcos, & Drew, 1997). The survey results also show that there is a marked variation in duration of contraction, duration of relaxation between contractions, and maximum numbers of repetitions per set patients are instructed to perform for endurance contractions. The duration of hold and that of relaxation were both reported to be greater than 30 seconds by majority of respondents.

At what strength are contractions held and how do you determine the % of maximum?

Although all respondents reported that they instructed their patients to perform sub-maximal contractions, there is a marked variation in the practices of surveyed physiotherapists with respect to the percentage of maximum strength the patient is instructed to perform the contraction. It is rather disappointing to see that only 43% respondents reported using objective methods to determine the % of maximum strength, such as biofeedback, digital rectal examination, and electromyography (EMG). Although studies show no correlation between PFM strength and continence physiotherapists are encouraged to use objective methods to determine the % of maximum strength to make their interventions consistent and outcome measures reliable. There were no specific studies in the literature that reported on the objective measure of % of strength but there are studies that used objective measures to record maximum PFM contraction, and to

make comparisons between digital and vaginal manometry (Frawley et al., 2006; Morin et al., 2004). Frawley's study reported that both digital and manometry measurement tools are reliable in certain positions, however manometry demonstrated higher reliability coefficients. Morin reported a significant relation between digital and dynamometric PFM assessment in women. However subjective appreciation of force level by digital evaluation is possible only when a large difference in force exists.

Do you include speed/quick contractions in your exercise protocol?

Speed contractions are practiced with several rapid forceful contractions in a short time frame (Woolner, Corcos, & Drew, 1997). Speed contractions are important to include in PFM exercise protocols because these contractions help the pelvic floor to cope with pressure, for example when patient sneezes, coughs or laughs. This works the muscles that quickly shut off the flow of urine. There is a marked variation in the practices of surveyed physiotherapists with respect to number of contractions patients are asked to perform and for number of seconds patients are instructed to perform speed contractions. However, 86.9% respondents reported using combination of maximum contraction and full relaxation for speed contractions.

What is the maximum number of repetitions per set you instruct your patients to perform?

The majority of physiotherapists reported that 5-10 repetitions was the maximum patients were instructed to perform per set of exercises for strength, endurance and speed contractions. This differed from what was reported in the literature as discussed later in the results.

How often do you increase the number of repetitions for strength and endurance contractions?

As far as progression of PFM exercises is concerned, this study had low reporting of a graduated pelvic floor exercise program. Only 35% of respondents reported they increased the number of repetitions for strength exercises on a weekly basis and 17.4% of respondents only increased the number of repetitions for endurance exercises based on the patients' ability and tolerance on a weekly or monthly basis. One of the principles of exercise progression is progressive overload. This is the gradual increase of stress placed on the body during exercise training (Kraemer & Ratamess, 2004), and this is achieved by increasing the number of repetitions added to an exercise protocol.

How many repetitions do you add when you progress your exercise protocol for strength and endurance contractions?

Forty-eight percent of respondents added five or fewer repetitions for strength contractions and 35% respondents added five or fewer repetitions for endurance contractions. Some of the common factors that contributed to the decision for number of repetitions to add were quality and strength of the contraction, fatigue, compliance, level of muscle improvement, functional improvement and change in symptoms. Doughty et al (1993) suggested an improvement in pelvic floor muscle coordination, hypertrophy and performance following a graded pelvic muscle exercise program in their study on the effect of a graded pelvic muscle exercise on urinary incontinence in women. Miller et al (1994) also advocated a graduated strength training exercise program in women.

How many times a day do you instruct your patients to perform PFM exercises and how many total contractions are patients expected to perform each day?

The survey also shows variation in prescribed frequency of PFM exercises. The majority of physiotherapists prescribed PFM exercise to be done three or more times a day. The total number of contractions a day spanned from a minimum of 6 to a maximum of 100 contractions a day. However 30-60 contractions was the most commonly reported total number of contractions performed a day.

There could be several possible explanations for practice variation. One possible explanation is that there are no evidence based PFM exercise protocols published for treating men with post-prostatectomy urinary incontinence that could be considered "gold standard". The protocols that are published in the literature lack some of the basic principles of exercise physiology such as inclusion of different types of contractions, frequency, intensity, duration of contractions and number of times a day to exercise. Another possible explanation is that there is no standardized formal entry level training or ongoing competency requirements for physiotherapists in Canada to ensure their competency in assessing and treating patients with pelvic dysfunctions and incontinence. Results from the survey support that respondents had varying level of training post graduation, skills, knowledge, and experience in treating post-prostatectomy urinary incontinence. None of the respondents received any information about post-prostatectomy urinary incontinence in their entry level physiotherapy training. Incontinence training is not considered to be an entry level requirement as it uses an invasive technique of internal work for treatment. In Canada physiotherapists cannot

claim to be specialists in a particular area of practice, but in order to be licensed to practice in a specific area such as spinal manipulation and acupuncture specific standards and requirements have to be met. In Alberta physiotherapists must complete a course on pelvic floor treatments that includes performing an internal examination and go through a mentorship program prior to being licensed with the College of Physical Therapists of Alberta to treat pelvic floor related conditions. Other post graduate courses and training as well as use of the literature and books are a means of acquiring skills in treatment of post prostatectomy incontinence. Respondents use different sources to obtain evidence for their practice. In fact only 52% respondents read peer reviewed journals to obtain evidence for their practice.

The second objective of the study was to compare the survey findings with that reported in the literature with particular attention to the number of repetitions per set and total number of daily contractions patients are to perform in a day.

Do you include strength and speed/quick contractions and endurance training in your exercise protocol?

One of the key differences between the study results and literature reviewed is that most survey respondents included all three types of contractions in their protocols. In contrast, only one study by Moore et al (1999) included protocols for both strength and endurance contractions. Significance of including the different types of contractions in PFM exercise protocols is that it takes into consideration the principles of exercise prescription. Three of the four principles of exercise prescription specificity and overloading for muscle training, and individualization of exercise regimes advocate

training muscles for strength and endurance based on the muscles function and composition of fibres such as the ratio of Type I and II fibres (Adhihetty et al., 2003; Kraemer & Ratamess, 2004).

How many times a day do you instruct your patients to perform PFM exercises?

All the physiotherapists' responses and data reported in the literature were similar in the number of times a day patients were instructed to perform PFM exercises. Results from the literature review reported 86% (Bales et al., 2000; Florates et al., 2002; Franke et al,. 1999; Meaglia et al., 1990; Porru et al., 2001; Filocamo et al., 2005) instructed patients to perform PFM exercises ≥3 times a day and 84% of the respondents in this study also instructed patients to perform exercises ≥3 times a day. Performing exercises three times a day is supported in the literature as a recommended number to promote muscle hypertrophy for strengthening skeletal muscles (Kraemer & Ratamess, 2004). The numbers of repetition are also a factor for muscle strengthening.

What is the maximum number of repetitions per set you instruct your patients to perform?

With respect to the number of repetitions per set patients are instructed to perform and total number of contractions patients are to perform in a day, there is marked variation in what literature suggests and what physiotherapists are practicing. Sixty percent of studies reviewed suggest more than 10 repetitions, ranging from 10-25 repetitions per set in contrast to only 22% physiotherapists asking their patients to perform more than 10 repetitions per set. The majority of physiotherapists (52%) ask their patients to perform between 5 and 10 repetitions per set.

How many total contractions are your patients expected to perform each day?

Similarly, 22% of survey respondents ask their patients to perform 30 or fewer contractions a day and only one of the studies reviewed suggest that. Fifty percent of the studies reviewed in the literature reported the total number of contractions performed to be greater than 45 contractions per day; however results of the study showed 61% of respondents reported instructing patients to perform 45 or more total contractions per day.

There is not only variation in what literature suggests and what physiotherapists are practicing with respect to number of repetitions and total number of contractions per day, but also marked variation for these two exercise parameters among the physiotherapists surveyed. This further emphasizes the need for development of evidence based PFM exercise protocols to treat post-prostatectomy urinary incontinence so that all physiotherapists treating these patients can provide consistent and best care.

The third objective of the study was to determine what client, therapist, environmental and socioeconomic related factors influenced the total number of treatment sessions patients receive in their treatment program.

Are there any factors that affect the number of treatment sessions your patients receive? If so what are they?

Considering the small number of physiotherapists treating post prostatectomy incontinence based on the response rate, the factor that least affected the number of treatments received were the physiotherapy related factors such as availability of

physiotherapist or the knowledge or skill level of the physiotherapist. Socioeconomic factors such as cost of treatment and ability to pay for the treatments were the next least rated to affect the number of treatments. Only three respondents indicated that the cost of treatment was a factor. This was surprising as there is little government funding available for the treatment of incontinence. The Capital Health Region in Alberta is the only region in Alberta that has specific funding for treatment of incontinence patients in the private sector. Funding for general physiotherapy treatments exists minimally in few provinces in Canada, and the costs for treatment of incontinent patients is relatively higher than what the government reimburses for treatments in the funded provinces. The assumption can be made then that patients pay for their treatment or have extended health coverage. This could be the case in British Columbia which reported to have the most number of physiotherapists (8) treating men with post prostatectomy incontinence. British Columbia is one of the provinces that have no government funding for physiotherapy in private practice, patients must therefore pay for all types of physiotherapy treatments received.

The factors that most significantly influenced the number of treatment sessions were client related ones with compliance and improvement being the two most frequently identified factors followed by distance to travel to access treatment and willingness to attend and finally the cost of treatment and age of the patient. The low reporting of cost of treatment being a factor influencing treatment sessions may be due to patients being used to paying for their treatments.

The expectation to see a higher reporting of travel distance being a socioeconomic factor that affected the number of treatments in a post prostatectomy pelvic floor exercise

program was not realized in spite of the widely distributed and small number of the physiotherapists treating post prostatectomy incontinence across the country.

It is interesting to note that 65% of the physiotherapists treating post prostatectomy incontinence have been practicing physiotherapy for more than 10 years; however the same percentage have only been treating men with post prostatectomy incontinence for 10 or fewer years. This finding shows that this area of practice is relatively new within the physiotherapy profession in Canada.

Study Limitations

Some limitations exist in this exploratory study. Sampling was limited to the selection of only current members of the Women's Health Division of CPA with active e-mail addresses, potentially creating a sampling bias. Another limitation was the lack of knowledge of the number of members in the WHD who treat men with post prostatectomy incontinence. The survey may also have missed physiotherapists who are not members of the Canadian Physiotherapy Association as membership is not mandatory. The sample response rate was 10%, indicating that study results may not depict current trend of PFM exercise protocols used by all physiotherapists in Canada. Other clinical surveys in the literature have reported higher response rates of 79% and 72% (Hurley et al, 2002; Li & Bombardier, 2001). The survey was conducted in English language only, potentially limiting response from therapists practicing in French.

The inclusion criteria may also have eliminated physiotherapists who had not treated post prostatectomy patients within the six month time frame prior to request for participation in the study.

Data analysis was difficult since some respondents provided responses in a range rather than exact numbers. The variability and the wide range of responses made it difficult to set range categories within which all the response ranges could be included. This resulted in a problem using SPSS 14.0 to analyze the data as the program cannot compute data entered as a range. The inclusion of an "other" category for a choice of response in some of the questions also posed a problem for analysis. Most respondents deferred to the "other" category rather than provide specific numbers for example to the question "how many repetitions do you add when you progress your exercise protocol for strength?" verbal rather than an actual number was reported. The varied and wide ranges reported in the literature and from the study results on the components of PFM exercise protocols may also have affected the outcomes of the study. Future study could include closed ended responses in the survey and more sophisticated analytic methods. However, the analysis conducted in this study was appropriate for an exploratory study and achieved the research objectives.

Finally it is interesting to note that the respondents in the study provided much more detailed information about the components of a pelvic floor exercise protocol than in the literature. This may have been influenced by the expectation for documentation of treatment parameters and outcomes in their practice.

Conclusion

This study is expected to provide some insight into the selection and type of exercise protocol used most frequently by physiotherapists in PFM re-education

for the treatment of post prostatectomy incontinence. Findings from the study may guide further research leading to the development of practice guidelines for PFM exercise and best practice in post prostatectomy incontinence physiotherapy intervention.

Pelvic floor muscle exercises are often used with men with post-prostatectomy incontinence as a means of controlling their incontinence. Current literature and the study results suggest that there is a significant variation in PFM exercise protocols used by physiotherapists in treating urinary incontinence in men with post-prostatectomy incontinence. One can speculate as to the effects this variation in PFM exercise protocols can have on treatment outcomes and the successful control or elimination of post prostatectomy urinary incontinence.

Despite the limitations of this study noted above, the findings from this survey are important. This is the first study documenting the practice behaviors of Canadian physical therapists in treating patients with post-prostatectomy urinary incontinence using PFM exercises as a treatment technique. The results may serve as a baseline to guide future education and research in the field.

Physiotherapists working with men with post prostatectomy urinary incontinence need to initiate more studies about PFM exercises and how they can be best provided. This development and collection of practice patterns and evidence could assist Canadian physiotherapists in providing evidence-based assessments and interventions when treating urinary incontinence in men.

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Appendix A

Email letter of invitation to participate in study

Pelvic Floor Muscle Exercise Protocols for Post Prostatectomy Incontinence: A Survey of Physiotherapists' Current practice in Canada

Dear Colleague,

I would like to invite you to participate in a study to examine the practices of physiotherapists who treat men with post prostatectomy incontinence using Pelvic Floor Muscle (PFM) exercises. The purpose of the study is to determine the treatment choices and reasons for PFM exercise protocols used in clinical practice. This study forms part of my thesis as a graduate student at the University of Alberta, Faculty of Rehabilitation Medicine.

Your participation involves filling out a questionnaire that includes questions about PFM exercises and other background information. If you have treated at least one post prostatectomy patient in the last six months, you are asked to fill out the questionnaire

You may access and complete the questionnaire on the web by clicking on the provided link at http://www.surveymonkey.com. The questionnaire should take about 20 minutes to complete. Please return your completed questionnaire by January 31st 2007 or earlier.

There are no benefits to you personally. However, the results may be used by physiotherapists to inform their choices of PFM exercise protocols. The results may help researchers to understand the characteristics of PFM exercises used by clinicians for treating post prostatectomy incontinence. Your responses may contribute to information that can be used in the future to develop practice guidelines for PFM exercise protocols.

There are no identified risks with participation in this study.

All information collected will remain confidential and you are not required to give your name. Results of the findings will only be reported as a group. If you would like a summary of the results, please check the website for posted results, which will be available by March 31st 2008.

Participation is voluntary. If you choose to participate, your return of the questionnaire will be taken as your consent.

If you have any concerns about this study, please contact Paul Hagler, Associate Dean of Research, Faculty of Rehabilitation Medicine at paul.hagler@ualberta.ca or at (780) 492-9674. This person is not associated with the study.

You may contact the principal investigator at the address or phone listed below if you have any questions about this study.

Sincerely,

Anna Hughton, MCSP

Postal address:	North Town Physiotherapy
	2002 Northgate Centre
	9499 - 137th Avenue
	Edmonton, Alberta T5E 5R8
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Appendix B

Questionnaire

Pelvic Floor Muscle Exercise Protocols for Post Prostatectomy Incontinence: A Survey of Physiotherapists' Current practice in Canada

The purpose of this survey is to gather information from physiotherapists who treat patients with post prostatectomy incontinence using PFM exercises as part of the treatment regime. The intent of the survey is to gather details about the components of PFM exercise protocols being used to treat post prostatectomy incontinence

Please complete this questionnaire if you have treated at least one post prostatectomy patient in the past six months.

If you do not treat patients with post prostatectomy incontinence DO NOT COMPLETE THE QUESTIONAIRE.

All questions must be answered in order to be able to submit the questionnaire.

Section A: Type of contraction included in your PFM exercise protocol

1. Do you include strength contractions in your exercise protocol? Yes No

If yes a) how long are contractions held ?_____seconds

b) how long is the rest time after each contraction? _____seconds

2. Do you include endurance training in your exercise protocol? Yes No

If yes a) how long are contractions held ? _____seconds

b) how long is the rest time after each contraction? _____seconds

c) at what strength are the contractions held (% of maximum)_____

d) if % of maximum how do you determine the % of maximum?_____

3. Do you include speed/quick contractions in your exercise protocol? Yes No

If yes a) how many repetitions?_____number

b) in how many seconds_____seconds

c) which of the following combination do you use for the speed contractions?

I maximum contraction and full relaxation	Yes	No
II maximum contraction and partial relaxation	Yes	No
III submaximum contraction and full relaxation	Yes	No
1V submaximum contraction and partial relaxation	Yes	No

Section B: Exercise protocol

4. How do you determine initial contraction duration (hold)?

a) based on the length of time patient is able to hold contraction _____

b) always start with <5 second hold _____

c) always start with 5 second hold _____

d) always start with 10 sec hold _____

e) other hold times used for initial contraction _____

5. What is the maximum number of repetitions per set you instruct your patients to perform?

a) strength contractions? _____

b) endurance contractions?_____

c) speed contractions?_____

6. How often do you increase the number of repetitions for strength contractions?

a) daily _____

b) weekly_____

c) monthly_____

d) other_____

7. How often do you increase the number of repetitions for endurance contractions?

a) daily _____

b) weekly_____

c) monthly_____

d) other_____

8. How many repetitions do you add when you progress your exercise protocol for strength contractions?

a) _____(reps)

b) other_____

9. How many repetitions do you add when you progress your exercise protocol for endurance contractions?

a) _____(reps)

b) other _____

10. If the number of repetitions you add varies depending on patient response, what factors contribute to your decision regarding the number of repetitions you add?

_____

_____

11. How long do your patients take to progress from minimum to maximum number of contractions per day? _____(weeks)

12. When instructing your patients to perform PFM exercises how many times a day do you suggest ?

a) once _____

b) twice_____

c) three_____

d) >three (please specify)_____

13. How many total contractions are your patients expected to perform each day

_____

14. When do you instruct patients to incorporate contractions with functional activities?

a) after initial assessment?_____

b) at the end of treatment program?_____

c) other (please indicate)_____

15. What functional activities do you include with

a) strength contractions?_____

b) endurance contractions?_____

c) speed/quick contractions?_____

Section C: Treatment program

16. How often do you see patients for treatment?

a) _____days per month

b) other_____

17. On average how many total treatment sessions do your patients receive?

a) 1-5_____

b) 6-10_____

c) 10-15_____

d) 15-20_____

e) >20 (please specify)_____

18. Are there any factors that affect the number of treatment sessions your patients receive? If so what are they?

_____

_____

Section D: About yourself

19. How long have you been practicing physiotherapy?_____

20 What is your highest level of education?

a) Dip PT_____

b) BScPT_____

c) MPT_____

d) MSc PT_____

e) Ph D_____

21. How long have you been treating men for post prostatectomy incontinence?

_____

22. How many patients with post prostatectomy incontinence do you see per month?

a) 1-5_____

b) 6-10_____

c) 11-15_____

d) 15-20_____

e) >20 (please specify)_____

23. How did you acquire your skills and knowledge to treat post prostatectomy incontinence?

a) courses_____

b) conferences_____

c) from other colleagues_____

d) from publications such as journals, research articles or textbooks (please indicate)_____

24. What sources of evidence influence your practice?

a) journals (please specify which ones)_____

b) conferences _____

c) courses_____

25. Did you receive any information about post prostatectomy incontinence in your entry level education?

a) yes_____

b) no_____

26. What city do you practice in? _____

27. Additional comments _____

Thank you for completing the survey questions. A summary of the results will be posted on the following web site by March 31st 2008

Please click on SEND to submit your responses

Appendix C

Letter of request to participate as an expert reviewer

Pelvic Floor Muscle Exercise Protocols for Post Prostatectomy Incontinence: A Survey of Physiotherapists' Current practice in Canada

Dear Physiotherapist

I would like to invite you to assist in the development of a questionnaire designed to gather information on PFM exercise protocols used for treating post prostatectomy incontinence. Your skills and expertise in the area of PFM exercises has prompted this request for your participation as an expert reviewer.

This study forms part of my thesis as a graduate student at the University of Alberta, Faculty of Rehabilitation Medicine. The purpose of the study is to determine the similarities and differences among physiotherapists with respect to the application of PFM exercise protocols for treatment of post prostatectomy incontinence.

There are no personal benefits to you. However the study is expected to provide some insight into the selection and type of exercise protocol used most frequently by physiotherapists in PFM re-education for the treatment of post prostatectomy incontinence. Findings from the study may guide further research leading to the development of practice guidelines for PFM exercise and best practice in post prostatectomy incontinence physiotherapy intervention.

There are no anticipated risks.

Your involvement will consist of your completing the questionnaire designed for the study and providing feedback. A copy of the questionnaire will be sent to you with instructions on how to complete the questionnaire and guiding questions to use to provide feed back. You will also be expected to meet me to discuss your feedback and recommendations. If needed you may be required to repeat the process until consensus is reached amongst the reviewers. Your total time commitment is estimated to be approximately 3 to 4 hours.

Thank you for considering assisting with the study.

Yours Sincerely

Anna Hughton MCSP

Postal address:	North Town Physiotherapy
	2oo2 Northgate Centre
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Appendix D

Letter to expert reviewers

Pelvic Floor Muscle Exercise Protocols for Post Prostatectomy Incontinence: A Survey of Physiotherapists' Current practice in Canada

Dear Karen/Dianna/Merle

Thank you for your assistance in the development of this questionnaire examining PFM exercises protocols for treatment of post prostatectomy incontinence. Please fill out the enclosed questionnaire and use these guiding questions to provide your feedback. Return the completed questionnaire with the feedback sheet to me by September 15th 2006. Once I receive your questionnaire and feedback I will arrange to meet with you at your convenience to further discuss your responses and feedback.

You may contact me at 473-1461 should you have any questions about the questionnaire or the feedback questions.

Sincerely,

Anna Hughton MCSP

Postal address:	North Town Physiotherapy
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Appendix E

Guideline for reviewing the contents of the study Questionnaire

1. How long did it take you to complete the questionnaire?_____

2. Were there any questions in Sections A, B or C that do not reflect the components of PFM exercise that should be revised or excluded?

   If yes please list which ones and give your reasons why._____

3. Are there any additional questions about PFM exercises that should have been included?

   If yes please list them and explain. _____

4. Were there any questions that were ambiguous or difficult to understand?

   If yes please list which ones and explain._____

5. Are there any response options that were unclear?

   If yes please list them and explain._____

6. Additional comments _____

Thank you for completing the questionnaire and for your feedback.

Please mail your questionnaire and responses back in the enclosed self addressed envelope

Postal address:	North Town Physiotherapy
	2oo2 Northgate Centre
	9499 - 137th Avenue
	Edmonton, Alberta T5E 5R8
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Appendix F

Follow-up email letter to participants

Pelvic Floor Muscle Exercise Protocols for Post Prostatectomy Incontinence: A Survey of Physiotherapists' Current practice in Canada

Dear Colleague

This is a follow up to the original invitation to participate in the study on the current practices of physiotherapists using PFM exercises to treat post prostatectomy incontinence. If you have already completed the questionnaire please ignore this reminder and thank you for your response.

Your participation in this study by completing the questionnaire will provide information that may be used in the future development of practice guidelines for PFM exercise protocols.

If you have not completed the questionnaire please do so by clicking on the link www.surveymonkey.com. The questionnaire will take about 20 minutes of your time.

Sincerely,

Anna Hughton, MCSP

Postal address:	North Town Physiotherapy
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