Chapter 1

Overview of physical therapy for pelvic floor dysfunction

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PELVIC FLOOR DYSFUNCTION
The framework of this book is based on the approach to disorders of the pelvic floor in women described by Wall & DeLancey (1991). Wall & DeLancey (1991) stated that ‘pelvic floor dysfunction, particularly as manifested by genital prolapse and urinary or fecal incontinence, remains one of the largest unaddressed issues in women’s health care today’ (p. 486). In their opinion lack of success in treating patients with pelvic floor dysfunction is due to a professional ‘compartmentalization’ of the pelvic floor.

Each of the three outlets in the pelvis has had its own doctor and medical specialty, with the urethra and bladder belonging to the urologist, the vagina and female genital organs belonging to the gynaecologist, and the colon and rectum belonging to the gastroenterologist and the colorectal surgeon (Fig. 1.1).

Wall & DeLancey (1991) argue that instead of concentrating on the three ‘holes’ in the pelvis, one should look at the ‘whole pelvis’ with the pelvic floor muscles (PFM), ligaments and fasciae as the common supportive system for all the pelvic viscera.

The interaction between the PFM and the supportive ligaments was later elaborated by DeLancey (1993) and Norton (1993) as the ‘boat in dry dock theory’. The ship is analogous to the pelvic organs, the ropes to the ligaments and fasciae and the water to the supportive layer of the PFM (Fig. 1.2).

DeLancey (1993) argues that as long as the PFM or levator ani muscles function normally, the pelvic floor is supportive and the ligaments and fascia are under normal tension.

When the PFM relax or are damaged, the pelvic organs must be held in place by the ligaments and
fasciae alone. If the PFM cannot actively support the organs, over time the connective tissue will become stretched and damaged.

Bump & Norton (1998) also used this theoretical framework in their overview on the epidemiology and natural history of pelvic floor dysfunction. They suggested that pelvic floor dysfunction may lead to the following conditions:

- urinary incontinence (stress, urge and mixed incontinence);
- fecal incontinence;
- pelvic organ prolapse;
- sensory and emptying abnormalities of the lower urinary tract;
- defecatory dysfunction;
- sexual dysfunction;
- chronic pain syndromes.

Bump & Norton (1998) also described three stages in the development of pelvic floor dysfunction:

1. a perfect pelvic floor that is anatomically, neurologically, and functionally normal;
2. a less than perfect, but well-compensated pelvic floor in an asymptomatic patient;
3. a functionally decompensated pelvic floor in the patient with end-stage disease with urinary incontinence, anal incontinence, or pelvic organ prolapse.

A model describing etiological factors possibly leading to or causing pelvic floor dysfunction in women has been developed, classifying the factors into:

- predisposing factors (e.g. gender, genetic, neurological, anatomical, collagen, muscular, cultural and environmental);
- inciting factors (e.g. childbirth, nerve damage, muscle damage, radiation, tissue disruption, radical surgery);
- promoting factors (e.g. constipation, occupation, recreation, obesity, surgery, lung disease, smoking, menstrual cycle, infection, medication, menopause);
- decompensating factors (e.g. ageing, dementia, debility, disease, environment, medications).
Wall & DeLancey (1991) argued that progress in the treatment of pelvic floor dysfunction in women would occur more rapidly if a unified, cross-disciplinary approach to disorders of the pelvic support was developed.

Wall & DeLancey (1991) mentioned only the different medical professions as part of a multidisciplinary team. In this book we will argue that physical therapists (PTs), having assessment and treatment of the musculoskeletal system in general as their speciality, should be core professionals in a multidisciplinary approach to pelvic floor dysfunction.

**PHYSICAL THERAPY FOR THE PELVIC FLOOR**

**The nature of physical therapy**

In May 1999, at the 14th General Meeting of The World Confederation for Physical Therapy (WCPT), a position statement describing the nature and process of physical therapy/physical therapy was approved by all member nations (1999). This description will be used as a foundation and framework to give an overview of physical therapy/physical therapy in the area of pelvic floor dysfunction. The term ‘physical therapy’ will be used throughout this book, in accordance with the guidelines of the WCPT Europe.

According to the WCPT, physical therapy is ‘providing services to people and populations to develop, maintain and restore maximum movements and functional ability throughout the lifespan’.

The main area of practice for PT is musculoskeletal pain and dysfunction. However, many PTs also specialize in other areas such as the cardiorespiratory field, neurology, and coronary disease. In all areas PTs aim to improve functional capacity and improve the patients’ ability to maintain or increase physical activity level.

The PFM are not responsible for gross motor movements alone, but work in synergy with other trunk muscles. Therefore, pelvic floor dysfunction may lead to symptoms during movement and perceived restriction in the ability to stay physically active (Bo et al 1989, Nygaard et al 1990). Several studies have shown that, for example, urinary incontinence may lead to a change in movement patterns during physical activities (Bo et al 1989, Nygaard et al 1990), withdrawal from regular fitness activities and bother when being active (Brown & Miller 2001, Nygaard et al 1990).

Lifelong participation in regular moderate physical activity is important in the prevention of several diseases, and is an independent factor in the prevention of osteoporosis, obesity, diabetes mellitus, high blood pressure, coronary heart disease, breast and colon cancer, depression and anxiety (Bouchard et al 1993).

In addition, limitations in the ability to move or conduct activities of daily living either due to age or injuries may also lead to other problems, such as secondary incontinence.

Physical therapy for pelvic floor dysfunction may therefore also include physical activities for increasing general function and fitness level.

‘Physical therapy includes the provision of services in circumstances where movement and function are threatened by the process of aging or that of injury or disease’

WCPT

Hippocrates (5th–4th centuries bc) claimed that ‘all parts of the body which have a function, if used in moderation and exercised in labors in which each is accustomed, become thereby healthy, well-developed and age more slowly, but if unused and left idle they become liable to disease, defective in growth, and age quickly’.

The PFM are subject to continuous strain throughout the lifespan. In particular, the pelvic floor of women is subject to tremendous strain during pregnancy and childbirth (Mørkved 2003). In addition, hormonal changes may influence the pelvic floor and pelvic organs and a decline in muscle strength may occur due to aging. Hence, the PFM may need regular training to stay healthy throughout life.

‘Physical therapy is concerned with identifying and maximizing movement potential, within the spheres of health promotion, prevention, treatment, and rehabilitation’

WCPT

Physical therapists may promote PFM training (PFMT) by writing about the issue in newspapers and women’s magazines, informing all their regular patients about PFMT, including PFMT in regular exercise classes and in particular in antenatal and postnatal training, as well as before and after pelvic surgery in men and women. Physical therapists who treat pelvic floor dysfunction should be fully trained in this specialty or should refer to colleagues who have the thorough knowledge to treat patients according to the principles of evidence based physical therapy.

‘Physical therapy is an essential part of the health services delivery system’

WCPT
PTs practice independently of other health care providers and also within interdisciplinary rehabilitation/habilitation programs for the restoration of optimal function and quality of life in individuals with loss and disorders of movement.

WCPT

In most countries physical therapy work is by referral from medical practitioners. However, during recent decades this has changed in some countries such as Australia and New Zealand. In 2006 Dutch PTs have also become primary contact practitioners. Both systems require good collaboration between the medical and physical therapy professions.

The referral system implies that the medical practitioner is aware of what the PT can offer, and also has PTs available to send referrals to. One of the weaknesses of this system is that medical practitioners who are not motivated or who have insufficient knowledge about the evidence for different physical therapy interventions will not send suitable patients to physical therapy. The patients will more likely be offered traditional medical treatment options such as medication or surgery. These treatments may have adverse effects and are more expensive than exercise therapy (Black & Downs 1996, Smith et al 2002). In addition, the referral system is expensive because it involves an extra consultation.

The argument against PTs as primary contact practitioners has been that PTs do not have enough education to make differential diagnoses, and may therefore not detect more serious diseases such as cancer or neurological disease underlying the symptoms.

The editors of this book do not take a stand for either system of physical therapy service. We believe that prevention and treatment of pelvic floor dysfunction needs a multidisciplinary approach and would encourage collaboration between physicians and PTs at all levels of assessment and treatment.

Physical therapy involves “... using knowledge and skills unique to physical therapists and, is the service ONLY (author’s emphasis) provided by, or under the direction and supervision of a physical therapist.”

WCPT

The educational standard of PTs differs between countries throughout the world. In the US, physical therapy is at master’s degree level (although this is based on an undergraduate degree other than physical therapy), whereas in most countries in Europe, Asia, Africa, it is a 3-year bachelor degree and in Australia and New Zealand it is a 4-year bachelor degree with the possibility to continue with a master’s degree and PhD.

Physical therapy schools are within the university in many countries, but in other countries physical therapy is taught in polytechnic schools or colleges below university level.

There can be different educational requirements for entry into undergraduate programmes within one country and from country to country. In most countries, however, physical therapy is a professional education and the entry level for physical therapy undergraduate studies is very high, in some countries being at the same level as medicine. In the area of pelvic floor dysfunction, several PTs are professors and many PTs throughout the world have master’s and PhDs.

The emphasis on pelvic floor dysfunction in undergraduate physical therapy curricula varies between countries at both undergraduate and postgraduate physical therapy level. The broad knowledge of anatomy and physiology, medical science, clinical assessment and treatment modalities learnt by all PTs can be applied to the pelvic floor. Several countries also have postgraduate education programmes for PTs specializing either in women’s health or pelvic or pelvic floor physical therapy with education level and content varying between countries.

The physical therapy process includes assessment, diagnosis, planning, intervention, and evaluation.

WCPT

Assessment

Assessment includes both the examination of individuals or groups with actual or potential impairments, functional limitations, disabilities, or other conditions of health by history taking, screening and the use of specific tests and measures, and evaluation of the results of examination through analysis and synthesis within a process of clinical reasoning.

WCPT

In patients with pelvic floor dysfunction, after thorough history taking, the PT will assess the function of the pelvic floor by visual observation, vaginal palpation and/or measurement of muscle activity (measurement of vaginal or urethral squeeze pressure, electromyography [EMG], ultrasound) (Bø & Sherburn 2005).

Diagnosis

In carrying out the diagnostic process, physical therapists may need to obtain additional information from other professionals.

WCPT

Most PTs in private practice obtain referrals of patients from general practitioners. These medical practitioners themselves seldom have access to urodynamics, EMG, magnetic resonance imaging (MRI) or ultrasound.
According to the Report from the Standardization Subcommittee of the International Continence Society (Abrams et al 2002) a diagnosis of stress or urge incontinence or pelvic pain syndrome cannot be based on history taking alone. Therefore, interdisciplinary collaborations with other professionals are highly recommended. In real life most PTs in private practice treat patients who have not undergone a thorough diagnostic investigation.

DeLancey (1996) has suggested that the cure and improvement rates of PFMT would be higher for stress urinary incontinence (SUI) if more detailed knowledge about the pathophysiology of each patient was available.

Planning

*A plan of intervention includes measurable outcome goals negotiated in collaboration with the patient/client, family or care giver. Alternatively it may lead to referral to another agency in cases which are inappropriate for physical therapy*

WCPT

It is extremely important that the patient decides the final goal of the treatment. For example, not all women need to be totally dry during jumping because they may never perform this activity.

One goal for an elderly woman might be to be able to lift her grandchild without leaking or feeling heaviness from a pelvic organ prolapse. If she is able to contract the PFM with a certain degree of strength this may be quite easy to accomplish with proper instruction of pre-contraction of the PFM before and during lifting.

Another woman may want the goal of being totally dry or having good organ support while playing tennis (Bø et al 2004a). To achieve this she may need much more intensive PFMT training because she needs to build up muscle volume and stiffness of the pelvic floor and gain an automatic PFM action during an increase in abdominal pressure or a high ground reaction force (Bø 2004b).

Because most PTs treat patients with pelvic floor dysfunction without a full diagnosis it is of utmost importance that they communicate with other medical professions if they discover discrepancies between expected outcomes, or suspect other underlying conditions to be the cause of the patient’s complaints. For example, urgency and urge incontinence may be the first signs of multiple sclerosis.

Intervention

In general physical therapy intervention is implemented and modified in order to reach agreed goals and may include: manual handling; movement enhancing; physical, electro-therapeutic and mechanical agents; functional training (muscle strength and endurance, coordination, motor control, body-awareness, flexibility, relaxation, cardiorespiratory fitness); provision of aids and appliances; patient/client related instruction and counseling; documentation and communication.

WCPT

In treating pelvic floor dysfunction the mainstay of physical therapy is education about the dysfunction, in-formation regarding lifestyle interventions, manual techniques and PFMT.

PFMT can be taught with or without the use of biofeedback or other adjunctive therapies, such as electrical stimulation or mechanical agents. It includes teaching of the correct contraction, muscle and body awareness, coordination and motor control, muscle strength and endurance, and relaxation.

The PT will choose different treatment programmes for different conditions and different patients. In some cases the PT will also provide preventive devices to the patients, and teach them how to use them.

Interventions may also be aimed at preventing impairments, functional limitations, disability and injury and include the promotion and maintenance of health, quality of life, and fitness in all ages and populations.

To prevent urinary incontinence, teaching pelvic floor exercises in pregnancy and after childbirth is essential.

The choice of interventions should always be based on the highest level of evidence available.

Ideally, the PT will choose the protocol from a randomized controlled trial (RCT) where the intervention has been shown to be effective and adjust this to the patient’s needs and practical requirements.

In the area of SUI there is sufficient knowledge from RCTs to choose an effective training protocol. However, in other conditions that may be caused by pelvic floor dysfunction such knowledge is not yet available. The PT then has to develop a programme on the basis of clinical experience (his or her own or other experts), small experimental studies or theories. It is essential that such experience or theories are quickly developed into research hypotheses and tested in RCTs by trained researchers to see if there is a clinically worthwhile effect.

Collaboration between experienced clinicians and researchers is extremely important in planning clinical research. Experienced clinicians should not jump at new theories and ideas or change their practice based on theories and small experimental studies alone. Ideally,
the only information that should lead to a drastic change of clinical practice are results (positive or negative) from RCTs.

When undertaking research and deciding on a PT intervention, the PT must be aware that the ‘quality of the intervention’, particularly the intensity of the physical therapy intervention, will affect the outcome. Ineffective (low dose) or even harmful treatments can be in a RCT that has high-quality methodology. These research challenges are the same when conducting RCTs that include both surgery and PFMT, and the methodological quality of studies of both surgery and PFMT has been variable (Hay-Smith et al 2001, Smith et al 2002).

When participating in research led by other professionals it is important that the physical therapy intervention meets quality standards. No drug company would dream of conducting a study with a non-optimal dosage of the drug. In published RCTs, there are several PFMT programmes with low dosage showing little or no effect (Hay-Smith et al 2001).

**Evaluation**

*Evaluation necessitates re-examination for the purpose of evaluating outcomes*

WCPT

Using the same outcome measures before and after treatment is mandatory for the purpose of evaluating outcomes in clinical practice.

In treating symptoms of pelvic floor dysfunction the PT uses different forms of PFMT (independent variable in experimental research) to change the condition (named dependent variable in experimental research e.g. stage of pelvic organ prolapse, pelvic pain or SUI).

It is mandatory that PTs use the concept of the International Classification of Impairment, Disability and Handicap (ICIDH) (1997), later changed to International Classification of Function (ICF) (2002) to evaluate efficacy of the intervention. The ICF is a World Health Organization (WHO)-approved system designed to classify health and health related states. According to this system (see Ch. 5.1) different health components are related to specific diseases and conditions:

- body functions: physiological and psychological functions of body systems (e.g. delayed motor latency of the nerves to the PFM);
- body structures: anatomical parts (e.g. rupture or atrophy of the PFM);
- impairments: problems in body function or structure such as significant deviation or loss (e.g. weak or non-coordinated PFM);
- activity: execution of a task or action by an individual (e.g. to stay continent during increase in abdominal pressure);
- participation: involvement in a life situation (being able to participate in social situations such as playing tennis or aerobic dancing without fear or embarrassment of leaking);
- environment (e.g. easy access to the bathroom).

Physical therapy aims to improve factors involving all these components. Therefore we need to select different outcome measures for different components. For example, PFMT may improve timing of the co-contraction during cough (ICF: body functions; neurophysiology). This may be measured by wire or needle EMG.

One of the aims for PFMT in treating pelvic organ prolapse (POP) is to alter the length/stiffness of the PFM so they sit at a higher anatomical location inside the pelvis (ICF: body structure, anatomy). This may be measured using MRI or ultrasound.

Impairment of the PFM can result from inability to produce optimal strength (force). Muscle strength can be measured by manometers or dynamometers during attempts of maximal contraction.

Ambulatory urodynamics of urethral pressure during physical activities may be developed as a future measure of automatic co-contraction during activity.

Urinary leakage could be classified as disability in the ICIDH and as activity in the new ICF system. The actual leakage can be measured by number of leakage episodes (self report) or pad tests.

Physical therapy also aims at, for example, reducing urinary leakage to a point where this is no longer restricting the patient from participation in social activities (ICF: participation). This can be measured by quality of life questionnaires. PTs can also work politically to improve the environment such as advocating for easy access to toilets in public buildings.

Ideally, PTs should assess the effect of the physical therapy intervention in all these components using outcome measures with high responsiveness (measurement tools that can detect small differences), reliability (intra- and inter-tester reproducibility), and validity (to what degree the measurement tool measures what it is meant to measure).

*PTs should ‘use terminology that is widely understood and adequately defined’ and ‘recognize internationally accepted models and definitions’* WCPT

In the area of pelvic floor dysfunction we are fortunate to have international committees working on
standardization and terminology. The International Continence Society (ICS) constantly revises its standardization of terminology (Abrams et al 2002), and the Clinical Assessment Group within the same society has also delivered a standardization document (www.icsoffice.com).

Physical therapists must refer to definitions and terminology from the WHO, the WCPT and for definitions and standards developed in exercise science and motor learning and control to be able to communicate effectively with other professions.

Linking research and practice

‘Emphasise the need for practice to be evidence-based whenever possible’ and ‘appreciate the interdependence of practice, research and education within the profession’

WCPT

Sackett et al (2000) has defined evidence-based medicine as ‘the conscientious, explicit and judicious use of current best evidence in making decisions about care of individual patients’. Neither the best available external clinical evidence (RCTs) nor clinical expertise alone is good enough for decision making in clinical practice. Without clinical experience, ‘evidence’ can ignore the individual’s needs and circumstances, and without evidence, ‘experience’ can become old fashioned/out of date.

Evidence-based (PT) practice has a theoretical body of knowledge, uses the best available scientific evidence in clinical decision making and uses standardized outcome measures to evaluate the care provided (Herbert et al 2005).

Herbert et al (2005) have stated that research conducted as part of routine clinical practice can be prone to bias because there is often a lack of comparison of outcomes with outcomes of randomized controls. In such studies it may be difficult to distinguish between effects of intervention and natural recovery or statistical regression. In addition, self-reported outcomes may be biased because patients may feel obliged to the therapist. There may be no record or follow-up of dropouts, outcome measures may be distorted by assessors’ expectations of intervention, adherence to the training protocol is seldom reported and long-term results are often not available. The best evidence of effects of intervention comes from randomized trials with adequate follow-up and blinding of assessors and, where possible, blinding of patients too.

Our understanding of the mechanisms of therapies is often incomplete, and it is unknown whether the effects of some PT interventions are large enough to be worthwhile (effect size).

Only high-quality clinical research (RCTs) potentially provides unbiased estimates of the effect size (Herbert 2000a, b). This provides several challenges in clinical practice.

To increase their level of knowledge in clinical practice PTs need to:

- stay updated in pathophysiology;
- use interventions for which we have evidence-based knowledge of dose–response issues;
- if possible: use interventions/protocols based on results/protocols from high quality RCTS with positive results (clinically relevant effect-size);
- use pre- and post-treatment tests that are responsive, reliable, and valid;
- measure adherence and adverse effects!

ROLE OF THE PHYSICAL THERAPIST IN PELVIC FLOOR DYSFUNCTION

- Work in a team with other professions in medicine (e.g. general practitioner, urologist, gynecologist, radiologist).
- Evaluate the degree of pelvic floor dysfunction symptoms and complaints and overall condition by covering all components of the ICF.
- Fully evaluate PFM performance, including ability to contract and strength.
- Set individual treatment goals and plan treatment programmes in collaboration with the patient.
- Treat the condition individually and/or conduct PFM exercise classes.
- Teach preventive PFM exercise individually or in classes during pregnancy and postnatally.
- Clinicians without a research background can participate in high-standard research as deliverers of high-quality physical therapy and conduct evaluation of the intervention. They should, however, refuse to be involved in studies with low-quality methodology and/or low-quality intervention (e.g. inadequate dosage).
- Research PTs should:
  - conduct basic research on tissue adaptation to different treatment modalities;
  - participate in the development of responsive, reliable and valid tools to assess PFM function and strength and outcome measures;
  - conduct high-quality methodological and interventional RCTs to evaluate effect of different physical therapy interventions.
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