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S. J. Markwell

Physical therapy management of pelvi/perineal and perianal pain syndromes

Abstract Pelvic floor physical therapy is considered to be effective in the management of functional urogenital and anorectal disorders. A functioning pelvic floor is integral to increases in intra-abdominal pressure, provides rectal support during defecation, has an inhibitory effect on bladder activity, helps support pelvic organs, and assists in lumbopelvic stability. Coordinated release of the sphincters within a supporting extensible levator ani allows complete and effortless emptying. A major feature of pelvi/perineal and perianal pain syndromes commonly encountered by multidisciplinary clinicians is pelvic floor imbalance and incoordination. Precise pelvic floor and abdominal muscle coactivity, based on research, is used clinically. Motor and cognitive learning which can alter peripheral and central pain mechanisms and produce physical changes in the CNS, viscera, smooth and musculoskeletal tissues is the basis of physical therapy in pelvic floor and pelvic organ pain management.

Pelvic floor exercises and Kegel's exercises are generally regarded as synonymous. During a pelvic floor (PF) contraction the pelvic organs and sphincters are lifted forwards in a cephalad direction and the vagina and rectum are compressed [14]. This is a mass muscle movement.

Functional anatomy

Puborectalis (PR) pulls the anorectal junction anteriorly, assisting in anal closure. PR and the external sphincter act as one unit. The pubococcygeal (PC) muscle tends to pull the coccyx forward, elevates all the pelvic organs and compresses the rectum and vagina. The PC and iliococcygeal (IL) muscles unite posterior to the anorectal junction and insert into the coccyx. This is termed the levator plate. The IL pulls the coccyx from side to side and elevates the rectum, which lies on the levator plate. The ischiococcygeal (IS) muscle, often rudimentary in humans, provides support for pelvic contents and contributes to sacroiliac joint stability. The levator ani and external anal sphincter exhibit tonic muscle activity and have a high proportion of slow twitch muscle fibres [14]. The transverse muscle of abdomen (TrA) contracts to pull the abdominal wall in: Internal obliques (IO) may assist. Multifidus (M) is the largest muscle spanning the lumbosacral junction [12]. The functional anatomy of the rectus abdominis (RA) and external oblique (EO) muscles is assumed.

Pain syndromes

Chronic pelvic, perianal and perineal pain may occur in the absence of infection, overt trauma, malignancy, or disease. Pain may radiate from above the pubis to the labia, urethra, vagina, penis, scrotum, anterior and posterior thighs, calves, and toes. Pain may peak in the fourth, fifth and sixth decades. This may be as a result of oestrogen withdrawal from tissues integral to organ support, other than striated muscle [1]. Somatovisceral manifestations of pain are common and may be as a result of long-term inappropriate muscle usage. Postural conditioning and psychosexual factors may be associated.

Loss of coordinated urinary, anorectal and sexual function to a greater or lesser degree accompanies the clinical pain syndromes outlined in Table 1. This table serves as a guide only as pain features may overlap or change during their course. Central pain mechanisms are more evident in vulvovestibulitis and pelvic muscle/organ dyssynergia. Prostatodynia and vulvodynia (not

S. J. Markwell (✉)
PO Box 288, Albion Queensland 4010, Australia

S. J. Markwell
Departments of Physiotherapy and Gastroenterology,
Royal Brisbane Hospital, Brisbane, Australia

classified) have elements of both pudendal traction and compression neuropathy. As the pudendal nerve is a mixed sensory and motor nerve, it assumes a central role.

The most common syndrome treated by our multidisciplinary team is the descending perineum syndrome (DPS). This refers to descent of the perineum below the plane of the ischial tuberosity at rest or on straining [11]. On examination, the perineum "balloons" below the bony outlet of the pelvis during a straining effort. It implies denervation and reinnervation of levator and sphincter muscles, fascial stretching and tearing, and rectal wall mucosal prolapse or rectocoele, with or without faecal incontinence. Ineffective and incomplete rectal emptying (obstructed defecation) and associated bladder dysfunction are often accompanied by pain. This syndrome can be the aftermath of difficult and multiple vaginal deliveries and straining at stool [14]. The degree of perineal descent appears to be correlated with the greatest change in neurological function [5]. The degree of descent during straining encountered by our team is usually between 5 and 12 cm from the resting level.

Background

A multidisciplinary prospective study (1990–1994) was undertaken to assess whether a specific motor learning program of defecation retraining would be useful in the management of 179 patients with chronic pain associated with DPS and the levator syndrome [8]. Follow-up ranged from 10 to 48 months with a mean of 16.5 months. One hundred and fifty-seven patients (87%) reported a good to very good response. Five non-responders had tethering of the filum terminale or S2 and S3 perineural cysts which were surgically managed. Twenty-two patients were assessed as having the levator syndrome and the majority, 151 patients, had perineal descent > 3 cm (DPS). Protocol for effective management had been established.

During this time, a new specific motor learning skill to build tension and shorten a stretched PC, thus enabling PC to function more normally, was conceptualized. It was proposed that by working the muscle in its altered direction, relief of pain and improved organ function would occur more quickly. Therefore, the muscle is now rehabilitated in the following ways according to the severity of descent.

First motor skill: PC contraction (minor perineal descent)

To facilitate PC specifically, the patient is asked to sit forward on a chair with legs apart (Fig. 1). Feet are flat on the ground. The spine is in extension and the belly flops with gravity. Tactile feedback is used by the physical therapist and the patient. Each places a hand in front of the anterior superior iliac spine (ASIS) and along the inguinal region to feel the contraction of TrA and IO. The fingers are spread upward to feel the weight of the belly and RA, to detect a lack of RA contraction. With a normal PC, the action is a low-level isometric hold. The request "to move the urethra and vagina gently upwards and hold" is repeated and held for endurance. This allows medial shift and elevation.

Second motor skill: Drawing forwards and upwards (moderate to severe perineal descent)

With abnormal descent of the perineum, a PC contraction is facilitated by the concept and action of muscle shortening, i.e., to move the urethra forwards and upwards (Fig. 2). Simple graphical education and explanation of the muscles and relevant anatomy are given. The sitting position is the same as in the first motor skill. The patient concentrates on a focal point on the wall (higher than eye level). The instruction is to "slowly draw the urethra forwards and upwards as though preparing to emulate the action of young boys, i.e. make your mark on the wall". The breath is not held; neither is the abdomen retracted or pushed out. The exercise is isometric, with a slow gradual development of tension to bring PC into its shortened range over time. Muscle fatigue must be guarded against. Endurance and strength training follow after 4 weeks.

The therapist can assess the correct muscle action by palpating for the coactivity of TrA and IO and a change in tension of the low thoracolumbar fascia. Patients are given feedback on the desired action and how to correct the action. The results of the motor learning, i.e., the future changes in pain relief and control, organ function, and postural correction that they should expect, are also given as part of learning this skill.

Third motor skill: Brace and bulge

Patients are taught to functionally adapt to their toilet. They are instructed to seat their pelvis well back and lean forward with trunk extended, with full hip and knee flexion. Legs are wide apart; feet are plantar flexed, or flat on the floor, and for those under 5 ft, on a stool [2].

This posture encourages a relaxed pelvic floor and allows diaphragm descent. Patients are instructed to "push their abdomen out" without an inspiratory effort. Isometric holding of upper and lower RA in its outer range allows the patient to detect a change in the anal sphincter. Patients are taught to initiate and hold this action during a defecatory urge.

Several months after PC, TrA/IO rehabilitation, the act of bracing (EO, IO, TrA) or "make your waist wide" is introduced. This raises intra-abdominal pressure further during defecation and simultaneous recruitment of PC and the lateral levators is observed by the patient [9].

Table 1 Clinical presentation and pain management [6, 13, 18] Adapted from [14]. Pain syndromes

Pain syndrome	Clinical presentation	Contributing factors	Physical therapy
Nerve entrapment			
Descending perineum syndrome (DPS) Pudendal traction neuropathy: at sacral roots, trunk or nerve branches Gravity related Associated with inadvertent straining at defecation	Nerve trunk pain ("toothache") – often rectal (may radiate) Burning perineal/perianal pain ("causalgia") Myofascial dragging i.e., Inguinal/ sacropelvic areas Affects both sexes-predominantly parous women (vaginal delivery) Associated with anorectal and urogenital prolapse and pelvic organ dysfunction in both sexes History of low back pain (and hernias – more common in males) May accompany IBS and endometriosis A history of pelvic organ surgery is common	Pain is exacerbated by defecation, straining at stool, prolonged standing and heavy lifting Pain is relieved by lying down Palpation over pudendal nerve per vaginam provokes pain History may include selective over-development of abdominal muscles, e.g., ballet dancers, body builders, martial arts. Musculoskeletal history necessary, e.g., impact activities Disturbance of normal abdomino/pelvic floor co-activation may be recent or longterm.	1. Defecation retraining – sitting posture – precise Rectus abdominis PR/EAS co-activation for sphincter release 2. Precise motor learning for stretched, damaged PC(NB muscle can fatigue easily) 3. Precise Transversus/Multifidus motor learning (deep stability muscles) 4. External oblique with IL coactivation represents later progression 5. Pain strategies Lying down after defecation Restrict heavy lifting and/or impact activities
Nerve compression			
Levator Syndrome Microcompression at conus medullaris, cauda equina, sacral roots, pudendal plexus, or internal pudendal nerve level May represent irritation of an already irritated nerve Pressure on L_1 (ilioinguinal nerve), L_1 and L_2 (genitofemoral nerve) may cause vulvodynia or vulvar pain	Perineal/perianal pressure, hypo- and parasthesiae May be unilateral or bilateral May radiate widely, i.e., exceed innervated area May present as muscle dysfunction outside the pelvic floor, e.g., piriformis Females at menopause predominate A history of surgery is common Hypertonicity of EAS/PR IL & IC Tenderness over muscle attachments to coccyx	Pain is exacerbated by sitting, cycling, defecation, coitus, stress Relieved by walking or standing Poor sacropelvic stabilization Involuntary or voluntary tensing of gluteals, levator ani and sphincters, cf jaw clenching or bruxism Must consider that causes other than microtrauma or ischaemia are common e.g., infiltrative.	Ensure that a thorough medical evaluation at all levels has been undertaken prior to treatment 1. Defecation retraining 2. Specific PC precise motor learning 3. Co-activation of deep stability muscles 4. Voluntary stretches of IL ("tail wagging") to treat hypertonicity which may be real or apparent
Sympathetically maintained pain			
Vulvar vestibulitis syndrome Minor tissue injury (e.g., pap smear, coitus) may result in a new sensitivity in the central nociceptive neurones This causes secondary hyperalgesia or excessive sensibility to pain	Severe pain on vestibular touch or attempted vaginal entry Vestibular erythema May be associated with urinary symptoms Real or apparent hypertonicity of superficial PFM Females of reproductive age predominate	Triggers e.g., infection, irritation See contributing factors in pudendal traction neuropathy, DPS	1. Stabilize PF by precise PC motor learning 2. Defecation retraining 3. Co-activation of deep stability muscles 4. Decrease real or apparent hypertonicity of lateral and sphincter muscles 5. Optimise positions and actions for coitus
Proctalgia Fugax			
Distension or hypermotility of rectosigmoid colon triggers hypertonia of the internal anal sphincter (IAS), and EAS and PR contract	Severe fleeting rectoanal pain ("red hot poker") Non-radiating Commonly lasts 3–4 min; may last longer Ultra slow waves of IAS on anorectal manometry	May accompany colorectal pathology, e.g., diverticulosis May follow colorectal surgery e.g. end to end anastomosis	1. Defecation retraining 2. Techniques to relax PR/EAS Local heat to: a) Perineum b) Sigmoid colon

Coccydynia (pain in or around the coccyx)	Pain on internal/external mobilization of coccyx	Follows history of trauma to sacrococcygeal joint	1. Orthopaedic regimen 2. As above for Pudendal traction neuropathy, DPS.
	Pain on rising from a chair May be associated with relative uni/bilateral levator hypertonicity May be associated with symptoms of any of above syndromes Affects both sexes	Musculotendinous attachments may be disrupted at the anococcygeal raphe, helping to destabilize the PF Degenerative or arthritic component	
Piriformis syndrome (deep seated buttock pain)	Pain on and just after sitting	Idiopathic	1. Stretches
	Pain on climbing stairs/inclines	Infiltrative	2. Resisted abduction, external rotation of the flexed hip.
	Dyspareunia	Muscle trauma	
Dyssynergic Pain Changes in central mechanisms evoke pain from somatic tissues Incoordinated levator activity with poor sphincter release	Pain on PR/EAS stretch Pain on voiding and incomplete voiding Pain on defecation "anismus" Dyspareunia "vaginismus" Non-relaxing PF Predominantly female	Dissociation of PF function Associated with violation or abuse Bladder and bowel may become more compliant and less contractile on emptying	1. Defecation and voiding retraining 2. Specific motor learning programme for PC 3. Optimise positions and muscle action during coitus to relax superficial introinal muscles.

Fourth motor skill: abdominal drawing-in

With the spine in neutral position and the abdominal wall relaxed, the patient is asked to draw the lower part of the abdomen up and in (TrA, IO), towards the spine without moving the trunk or pelvis [12]. This action is initiated without taking in a breath and may be practised in a variety of positions. The muscles are palpated in front of the ASIS by both therapist and patient. Normal breathing is required.

Fifth motor skill: bracing

Bracing "make your waist wide" (EO, TrA, IO) is used later for effort activities, such as lifting and sneezing, to recruit the lateral levators and PC for organ support during raised intra-abdominal pressure [9].

Discussion

When automatic motor patterns for function are disrupted, the body's key stabilizers in the abdomen, lumbopelvic region, PF, and diaphragm are compromised. This can occur when straining and repeated traction of the pudendal nerve allows the antigravity capacity of the PF to deteriorate [14]. As a result of the elongation of PC and its altered position within the pelvis, there is a change of direction of the muscle fibres. Precise motor learning to facilitate the damaged muscle has to be redirected.

Christensen et al. demonstrated that with a submaximal contraction the PF moved the bladder and urethra upwards [3]. Pubococcygeus contracts to support the rectum during normal defecation; however, in obstructed defecation (common in DPS) this muscle activity is not shown [7]. Pelvic floor muscles can exhibit voluntary selective activity, showing that PC contracts after PR when stimulated [17]. This may help to explain "paradoxical puborectalis contraction" in obstructed defecation [7].

Defecation requires rectal support, anal outlet release, and an effective expulsive effort [9]. Wennergren showed that young girls minimized the EMG activity of RA and relaxed their PF more effectively when they sat on the toilet with their feet supported and leaned forward. Other postures showed increased EMG activity of RA as this muscle contracted (shortened) to help balance the body [20]. The release of PR and EAS may be affected by an outer range isometric contraction of RA [9]. A rise in rectal pressure with a corresponding decrease in the resting pressure of the EAS is clearly shown during anorectal physiology testing, when patients are asked to "bulge" (Markwell unpublished data). Bulging refers to a sustained upper and lower RA isometric contraction in its outer range, without initiating the contraction with an inspiratory effort. Patients lie on their side with trunk extended and hips and knees fully

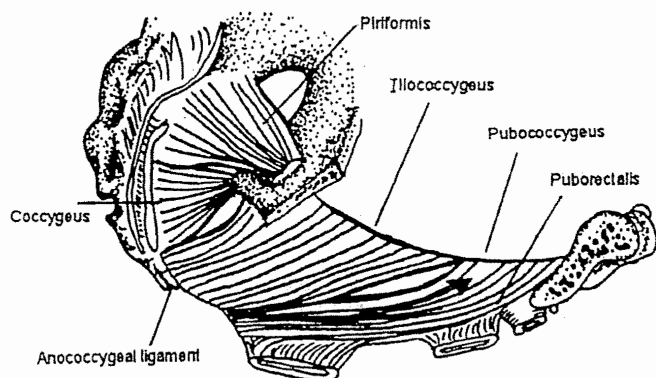

Fig. 1 Normal anatomy of the pelvic floor

flexed. In a urodynamic setting, Sapsford et al. showed that a drop in urethral pressure also occurs during abdominal bulging [16]. Patient education on defecation retraining showing this method has been used to complement biofeedback programs for anorectal dysfunction in the UK since 1994 [2]. RA bulging is used clinically to treat voiding dysfunction.

Many patients presenting with symptoms relating to pelvic organ dysfunction admit to low back pain and inguinal dragging. Richardson et al. [12] argue that TrA and multifidus are the most important stabilizers in the lumbopelvic region. The muscles are particularly vulnerable to dysfunction in low back pain patients and this is not pathology specific. TrA appears to work independently from the other abdominal muscles. "Its action is closely linked to that of the diaphragm and pelvic floor muscles. It appears to affect spinal support through its attachment to the thoracolumbar fascia and its close links to the development of intra-abdominal pressure" (p. 6) [12]. It is considered to work with lumbar multifidus to form a deep abdominal corset controlling the lumbopelvic joints during dynamic and static functional tasks. "This pattern of motor control is lost in low back pain patients" (p. 6) [12].

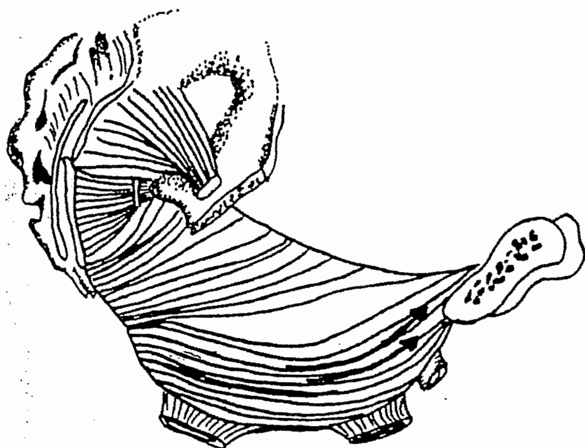

Fig. 2 Alteration of pubococcygeal muscle fibres in the descending perineum syndrome

Richardson et al. [12] have used submaximal PF contractions to facilitate both TrA and multifidus as part of their precise motor learning program. Recent research using fine wire EMG in the abdominal muscles showed increased activity in these muscles during a maximum PF contraction. Trunk extension optimized TrA and minimized RA, IO, and EO. A low effort pelvic floor contraction elicited activity in TrA predominantly [15]. Further EMG studies using fine wires in PC as well, demonstrated that PC was activated during a variety of isometric abdominal exercises [15], and that TrA played a part in urethral closure [16].

The close order of defecation retraining (PR release) and selective PC motor learning is essential to regain more balanced muscle recruitment. It is the first line of treatment for some pain syndromes and not others. This will depend on the degree of perineal descent and destabilization of the PF. Both PC recruitment and defecation are taught at the first session for pain syndromes with destabilization of the PF, whereas just defecation is taught initially in the dyssynergia pain syndrome.

The mechanism of neurophysiological "programming" is not clearly understood. Clinically, it was hypothesized that restoring the perineum to its optimum resting level within the limits of its acquired neurological deficit, must make the motor learning of the inner corset quicker and easier to achieve. A possible explanation for early symptom relief is the order, timing, and effective recruitment of PC.

Further clinical implications of disordered mechanics

The principles of motor learning outlined for pain relief in DPS have been used clinically for urge and stress incontinence, neuropathic faecal incontinence, voiding difficulties, and obstructed defecation [14]. Normal voiding is disrupted in men with DPS and frequency and incomplete voiding are common. Unrecognized perineal descent may be responsible for the small but significant percentage of men who have residual incontinence after prostate surgery.

Recently increased activity of the extrinsic nerve supply to the gut has been shown to occur in subjects who improved their defecatory function following a biofeedback program [4]. Painful mechano-inflammatory anorectal disorders such as solitary rectal ulcer syndrome and proctitis cystica profunda, along with anal fissures, occur with DPS and have been similarly managed by both physical therapy and biofeedback, with complete healing taking place [14, 19].

In our society, overt straining is easily identified and this may be modified in a variety of ways, e.g. dietary manipulation, bulking agents, physical therapy, and biofeedback. More insidious is inadvertent straining, and this occurs widely in females. This is often a result of social and cultural conditioning from puberty onwards, for example, avoidance of sitting socially with legs apart,

hovering over public toilets, and abdominal flattening with trunk flexion as a fashion aid. This leads over a period of time to selective muscle development with the adoption of trunk flexion as a toilet posture. Pushing down into the toilet occurs, as RA/PR release cannot be facilitated [10]. Perineal descent occurs with time. Lumbopelvic discomfort and loss of neutral trunk posture follow, leading to pain.

Conclusion

Physical therapy addresses pelvi/perineal and perianal pain syndromes by relating the aetiology to inappropriate muscle usage. In syndromes with destabilization of the pelvic floor it has been useful to modify the rehabilitation of PC according to the degree of perineal descent. Muscle extensibility and coordination is addressed in both the levator syndrome and organ dyssynergia. Normalization of defecation is required for all syndromes and the lumbopelvic supporting muscles are encouraged to regain their previous stabilizing role.

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