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Biotensegrity Focused Therapy for Pelvic Organ Prolapse: A Non-randomised Prospective Clinical Case Series.

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Abstract

Background Traditional treatments for pelvic organ prolapse (POP) assume weak pelvic tissue as the cause. Pelvic floor muscle training has been shown to improve POP symptoms but not prolapse stage and does not reduce rates of referral for future treatment (e.g., pessary or surgery). An alternative hypothesis is proposed that excessive tissue stiffness causes tension and pulling, which disrupts pelvic organ arrangement.

Objectives Treating pelvic tissue stiffness through Biotensegrity Focused Therapy is anticipated to improve organ position and prolapse symptoms.

Study Design Non-randomised prospective clinical case-series.

Methods Women presenting to a private physiotherapy practice in the United Kingdom with POP received Biotensegrity Focused Therapy. Treatment included a series of 1-hour physiotherapy sessions focusing on identifying areas of stiff pelvic tissue and using a direct myofascial release technique to normalise elasticity to restore dynamic equilibrium within the pelvis. Prolapse grade (mild, moderate, severe), pelvic floor strength (Modified Oxford Grading Scale), and self-reported symptoms (Pelvic Floor Distress Inventory, PFDI-20) were assessed at baseline and after final treatment.

Results 33 women received treatment. At baseline 23/33 (70%) presented with moderate to severe prolapse. After final treatment 3/33 (9%) had moderate and 0/33 (0%) had severe prolapse. 12/33 (36%) achieved complete recovery of organ position and shape. 27/33 (81.82%) women improved by at least one prolapse stage. Pelvic floor strength improved from mean 1.28 (SD 0.85) at baseline to 3.33 (SD 0.78) after final treatment. Self-reported PFDI-20 scores corroborated clinical observations, reducing from mean 98.77 (SD 42.43) at baseline to 49.87 (SD27.28) after final treatment, suggesting a clinically meaningful improvement. Mean treatments received was 6.06 (SD 2.28) sessions over a duration of 4.39 (SD 2.46) months.

Discussion Biotensegrity Focused Therapy was shown to have a beneficial impact on organ position and prolapse symptoms and may be an appropriate treatment for women with POP.

Key Words

Women's health physiotherapy; pelvic floor; myofascial release; health-related quality of life.

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Introduction

Pelvic organ prolapse (POP) is defined as the symptomatic descent of female pelvic organs [1] and is often described as when the organs in the pelvis slip down from their normal position and bulge into the vagina [2]. The international prevalence of the condition amongst women of childbearing age and older is estimated between 32-64% [3-5]. Increased vaginal parity is reported to be the strongest risk factor for POP [6-8], with each vaginal delivery risk of POP is estimated to increase by 10-20% [4]. The pathophysiology of POP is not yet fully understood but dysfunction of the levator ani muscle complex is typically indicated [9-11]. Trauma to pelvic floor muscles, including the levator ani muscle complex, is associated with childbirth and the degree of trauma to pelvic muscles has been shown to be correlated with the development of prolapse [12]. The mechanism through which this trauma leads to prolapse is commonly described as the development of a weakness and laxity which reduces the ability of the pelvic floor muscles to hold up the pelvic organs from below [2, 13]. As such, most treatments for POP attempt to rectify this, by either increasing the muscle bulk of the pelvic floor or raising the organs surgically within the pelvis. However, the efficacy of these approaches is surprisingly limited. For example, prolapse surgery failure rates have been reported between 31.3-41.1% [14-16]. Pelvic floor muscle training (PFMT) is commonly recommended as a conservative treatment for POP that aims to increase pelvic floor muscle strength to support pelvic organs from below [1, 17]. Several well designed Randomized Clinical Trials have evaluated the efficacy of PFMT on POP outcomes. These studies suggest that PFMT may offer improvement in prolapse symptoms particularly relating to sensation of 'vaginal bulge' or 'heaviness' and urinary incontinence but do not improve prolapse stage and do not reduce rates of referral for future treatment (e.g., pessary or prolapse surgery) compared to control groups [18-21]. The National Institute for Health and Care Excellence conducted an evidence review for lifestyle and conservative management options for POP [22]. The review cautioned "risk of bias" in the current body of evidence relating to high dropout rates and uncertainties regarding effect size. The review noted that the evidence of benefit for PFMT was limited to prolapse stages 1-2 and that there is currently insufficient evidence to recommend PFMT for prolapse stages 3-4. Other research studies have reported a lack of correlation between pelvic floor muscle strength and the severity of pelvic organ prolapse [23-27], which brings into question the assumption that the main cause of pelvic organ prolapse is weakened muscles.

Biotensegrity is a conceptual model that explains how biological organisms are dynamic yet stable structures that can function in any orientation. It demonstrates that the geometrical configuration of the whole structure provides dynamic support for the individual parts [28] via the use of triangulation and closed kinematic chains [29] rather than a system of stacked components supporting each other from below [30]. Unlike walls or houses built of stacked bricks, human bodies do not use compression mechanics for structural cohesion [28, 30-33]. Biotensegrity explains that forces within the human body are distributed multi-directionally through a dynamic web of tension and compression elements [33-36]. This means that they are light, energy efficient, dynamic, graceful, and responsive. This conceptual model offers a comprehensive explanation to how the pelvis is able to function in a variety of positions, such as crawling, and adapt to a variety of functions from "weight bearing to childbearing" [37]. The traditional model for explaining prolapse, that the urogenital hiatus is held closed by the pelvic floor muscles which support the organs from below [38-40], does not align with a biotensegrity model of pelvic support and function [30]. Galloway [41] described how the pelvic floor is capable of yielding without failing, due to the continuity of the biotensegral fascial support system. Changes in the balance of tissue tension will alter the directions of force transmission, causing a change in the arrangement of the constituent parts of the

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structure [42]. Therefore, where there is a change in alignment or arrangement, it is caused by an imbalance of tensions leading to altered structural configuration, rather than individual parts falling down within the body [30]. There is a fascial continuum between the pelvis, abdominal wall, and lumbar wall [43], the organs are themselves tensegral [28, 44, 45] and so are the spaces between them [31]. Viewing POP through the lens of biotensegrity makes it unlikely that pelvic organs could 'slip' or 'fall down' due to muscle weakness. It is more likely that pelvic trauma leads to areas of excessive tissue stiffness disrupting the normal balance and pulling pelvic organs out of their natural arrangement [46]. This aligns with recent research that demonstrates a correlation between pelvic floor muscle stiffness and symptomatology [47-49], evidence for the effectiveness of manual therapy to treat pelvic floor dysfunction [50-52], and developments within women's health physiotherapy to promote assessment and treatment of pelvic floor tension as well as weakness [53-55].

The current study presents a novel method for treating pelvic organ prolapse, called Biotensegrity Focused Therapy (BFT) [46]. BFT is a manual therapy that includes global movement assessment, pelvic tissue stiffness assessment, and myofascial release to internal pelvic tissue. The aim of BFT therefore, is to identify and release excessive pelvic tissue stiffness to restore healthy dynamic pelvic organ arrangement and functionality. The current study explores the relationship between BFT and pelvic organ prolapse to better understand the potential benefits and limitations of this therapeutic approach.

Methods

Case Description

This is a non-randomised prospective case series describing women's clinical presentations and self-reported symptoms before, during, and after BFT [46] for pelvic organ prolapse. Data was captured for all consenting women who completed treatment between March 2018 to March 2020. The current study follows on directly from our previous study [46], which reported the development of the BFT method during the treatment of 23 women. The current study presents new data. All women in the current study presented to a private physiotherapy practice in the North of England with self-reported symptoms of pelvic organ prolapse. Inclusion criteria for this study were: a confirmed diagnosis of pelvic organ prolapse by the treating therapist, willingness and capacity to consent to receive BFT, and consent for the use of anonymised clinical and demographic data. Most women received a prolapse diagnosis from an independent health professional, for example their General Practitioner, Health Visitor, or Gynaecologist but it was not a requirement for entry to the study. Women who had a prior history of surgery for pelvic organ prolapse or hysterectomy were excluded from the study. Chaperones were offered as standard to all attending patients. Due to the nature of the case series, which included only anonymised data collected during routine clinical practice, institutional ethical review was not required.

Intervention

Prior to treatment all participants' birth histories were taken, along with relevant musculoskeletal and gynaecological histories. Examinations included postural and gait assessments, quality of movement of single leg stand and squat, and range of passive medial hip rotation. These assessments were used to identify potential areas of pelvic stiffness to guide treatment planning. The majority of patients in this study had received an independent diagnosis of pelvic organ prolapse from their General Practitioner, Health Visitor, or Gynaecologist prior to treatment, using either the Baden-Walker [56] or POP-Q [57] grading system and these were recorded. In addition, all patients received internal vaginal assessment

in crook lying, undertaken by the treating therapist. No Valsalva was instructed as the therapist believes this unnecessarily aggravates symptoms and can cause patients' distress. The aim of prolapse assessment was to determine the degree of shape change of the lower rectum, or the direction and degree of displacement of bladder, urethra, or cervix from their expected position. The shape change, or degree of displacement was graded as mild (grade 1), moderate (grade 2), or severe (grade 3) as first reported in Crowle & Harley [46] and described in more detail below:

Cystocele: Cystoceles and urethroceles are assessed by placing a finger into the space to the left and right of the urinary structures on the anterior wall. The bladder should be found to sit against the anterior wall, superior to the pubic symphysis. When no cystocele is present there is equal space to the left and right of the bladder, it should feel firm and sit centrally above the pubic symphysis. When a mild cystocele is present the bladder is displaced either left or right by 5-10mm and the bladder will feel firm; for moderate cystocele the bladder will have deviated further, 10-15mm to one side and it may feel softer in this position. For severe cystocele the ball shape of the bladder is palpable at the hiatus, feels softer, and easily moves up and down with light pressure.

Urethrocele: The urethra should be felt as a hard structure, about the size of a fingertip. When no urethrocele is present the urethra is tucked up against the anterior wall in a central position. A mild urethrocele is a 5-10mm deviation from this position towards the left or right. A moderate urethrocele is a 10+mm deviation of the urethra from this position. A severe urethrocele is one where the urinary meatus is visible.

Cervical prolapse: For examination of cervix position the same hand position is used as described above, but the finger reaches deeper into the vagina, heading in a cephalad direction. Where no cervical prolapse is present the cervix will be found at the tip of the therapist's finger as a small round structure, high and central within the vagina. Where mild cervical prolapse is present the cervix will be positioned to the left or right of centre, 15-30mm away from the central and high position. For moderate cervical descent, deviation from the centre is increased to 30+mm the left or right, which means it is more caudal within the vaginal space. For severe cervical prolapse the therapist's finger can palpate the cervix without fully entering the vagina.

Rectocele: For examination of rectocele the hand is turned around, so the pads of the finger face posteriorly, and a second finger can be added if the patient consents. A light pressure is used to feel along the lower section of the rectum and its shape assessed. Where no rectocele is present the rectum feels like a soft cylindrical structure around 20-30mm wide and is positioned centrally along the posterior wall. Where a rectocele is present, the rectum shape is disrupted and pockets or bulges form. A mild rectocele is a pocket or bulge less than 20mm across. A moderate rectocele is a pocket or bulge 20-40mm across. A severe rectocele is a pocket or bulge larger than 40mm across.

The BFT assessment and treatment method has been described in detail previously [46]. In summary, assessment of pelvic tissue to identify areas of stiffness was made through digital palpation, testing the whole area for elasticity. BFT consists of direct myofascial release to excessively tight or stiffened pelvic structures, including scars. This was conducted vaginally, with the patient in crook lying. All women in the current study were instructed by the treating therapist to cease PFMT for the duration of treatment and to avoid excessive pelvic pressure or impact. For example, women were advised to reduce or stop any aggravating exercises and pelvic floor-safe alternatives were suggested; women were also advised avoid straining during urination or defecation and defecation strategies were explained to those experiencing difficulty emptying bowels. Advice regarding fluid consumption, stress management, footwear advice, and baby carrying techniques were also given as appropriate. Treatment sessions were typically completed within one hour and undertaken regularly until symptoms

resolved to the satisfaction of the patient and in agreement with the therapist. Satisfaction with treatment was determined through discussion between patient and therapist and was confirmed if the symptoms were agreed to be mild or occasional, were not easily aggravated, could be managed or resolved by the patient, or were not bothersome to the patient. All assessments and treatments were delivered by a qualified, insured and registered women's health physiotherapist, who is also an advanced myofascial release practitioner.

Outcome Measures

The severity of each prolapsed organ was recorded independently, using the above grading system, to monitor the change in each organ position and shape during treatment. Global prolapse severity was also recorded as the highest (worst) grade across prolapsed organs, assessed at baseline and after final treatment. Pelvic floor strength was assessed at baseline and after final treatment, to determine patients' ability to close, lift, and relax their pelvic floor muscles. Comparison between the patients' left and right sides was made. The Modified Oxford Grading Scale [58] was used: 0=no contraction, 1=flicker, 2=weak, 3=moderate, 4=good (with lift), and 5=strong. Women's self-reported symptom experience was captured using the short-form Pelvic Floor Distress Inventory [59] (PFDI-20) at baseline and after final treatment. The PFDI-20 measures global POP distress (POPDI-6); urinary distress (UDI-6); and colorectal-anal distress (CRADI-8). Subscale scores are calculated by determining the mean value of items and multiplying by 25 to obtain a value between 0-100. The instrument total score is the sum of each subscale, which ranges from 0-300. A higher score represented greater distress. The instrument subscale and total scores have been demonstrated to be reliable and valid with good sensitivity to change. A change in total score of 45 points or greater has been found to represent a clinical meaningful change in women with moderate to severe prolapse[59].

Outcomes

Thirty-three women participated in the current study. The clinical and demographic characteristics of the sample are shown in Table 1. Women were aged between 31-75 (mean 45) years. All women reported at least one birth, with 85% women reporting pelvic scarring (either episiotomy, birth tear, or both). Most women were diagnosed with cystocele (25/33, 76%) or rectocele (21/33, 64%). Just under half of the sample (15/33, 46%) had two prolapsed organs and just over half (19/33, 58%) were assessed to have moderate prolapse. Consistent with women self-referring for treatment, all women reported at least one prolapse symptom. The most frequently reported symptoms at presentation were urinary dysfunction (26/33, 79%) and a sensation of dragging, heaviness or pressure in the pelvis (23/33, 70%). Just under half the sample (14/33, 42%) reported pain in the hip, lower back, abdomen, or buttock in addition to prolapse symptoms.

Table 1. Participant demographic and clinical characteristics, N=33

Age years, mean (SD), range	44.58	(10.36)
Birth History		
Parity, mean (SD), range	1.79	(0.70)
Pelvic Scarring*, n (%)	28	(84.85)
Episiotomy, n (%)	18	(54.55)
Birth tears, n (%)	16	(48.49)
Forceps delivery, n (%)	12	(36.36)
Caesarean, n (%)	4	(12.12)
Clinical diagnosis		
Cystocele, n (%)	25	(75.76)
Urethrocele, n (%)	6	(18.18)

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Cervical descent, n (%)	14	(42.42)
Rectocele, n (%)	21	(63.64)
Number of prolapsed organs		
1, n (%)	9	(27.27)
2, n (%)	15	(45.46)
3, n (%)	9	(27.27)
4, n (%)	0	(0)
Global prolapse severity, grade 0-3		
No prolapse detected (grade 0), n (%)	0	(0)
Mild (grade 1), n (%)	10	(30.30)
Moderate (grade 2), n (%)	19	(57.58)
Severe (grade 3), n (%)	4	(12.12)
Patient-reported presenting symptoms		
Urinary dysfunction, n (%)	26	(78.78)
Defecatory dysfunction, n (%)	19	(57.57)
Sensation of bulge in vagina, n (%)	19	(57.57)
Sensation of dragging, heaviness, or pressure in pelvis, n (%)	23	(69.69)
Hip, lower back, abdomen, or buttock pain, n (%)	14	(42.42)
Scar pain, n (%)	8	(24.24)

** Pelvic scarring represents the total number of women presenting with either episiotomy or birth tear. N=total number of women in the sample; n=number of women; SD=standard deviation.*

Across the sample, the mean treatments received was 6.06 (SD 2.28) over a mean duration of 4.39 (SD 2.46), months. Clinical and self-reported outcomes at baseline and after final treatment are summarised in Table 2. At baseline 4/33 (12%) women presented with severe prolapse and 19/33 (58%) presented with moderate prolapse. After final treatment, no women were assessed to have severe prolapse, 3/33 (3%) were assessed to have moderate prolapse, 18/33 (55%) had mild prolapse, and 12/33 (36%) had no detectable prolapse. The mean improvement in prolapse stage was 0.94 (SD 0.61) with 27/33 (81.82%) women improving by at least one prolapse stage. Treatment focused on reducing areas of stiffness within pelvic tissue and restoring optimal elasticity. This was observed to reduce pull on nearby organs, which returned to their natural shape and/or positions at different times during treatment and to different extents. The greatest improvement in organ position was seen for urethrocele and cystocele: 4/6 (67%) women with urethrocele and 11/25 (44%) women with cystocele experienced complete recovery, whereby organs returned fully to their natural position. Complete recovery of prolapse was poorest for rectocele with just 4/14 (29%) women experiencing complete restoration of normal rectum shape.

Table 2. Prolapse diagnosis, pelvic floor function, and self-reported symptoms at baseline and follow-up, N=33

	Baseline	**After final treatment**
Prolapse severity, grade 0-4		
No prolapse detected (grade 0), n (%)	0 (0)	12 (36.36)
Mild (grade 1), n (%)	10 (30.30)	18 (54.54)
Moderate (grade 2), n (%)	19 (57.58)	3 (9.09)
Severe (grade 3), n (%)	4 (12.12)	0 (0)
Prolapsed organ		
Cystocele, n (%)	25 (75.76)	14 (42.42)
Urethrocele, n (%)	6 (18.18)	2 (6.06)
Rectocele, n (%)	14 (42.42)	10 (30.30)
Cervix, n (%)	21 (63.64)	13 (39.39)

PFDI-20		
Total Score, mean (SD)	98.77 (42.43)	49.87 (27.28)
POPDI-6, mean (SD)	37.88 (14.82)	18.69 (11.13)
CRAD-8, mean (SD)	23.39 (15.96)	12.12 (9.10)
UDI-6, mean (SD)	37.50 (23.43)	19.07 (15.42)
Modified Oxford Grading Scale (pelvic floor power)		
Mean (SD)	1.28 (0.85)	3.33 (0.78)
Grade 0, n (%)	6 (18.18)	0 (0)
Grade 1, n (%)	13 (39.39)	0 (0)
Grade 2, n (%)	12 (36.36)	5 (15.15)
Grade 3, n (%)	2 (6.06)	13 (39.39)
Grade 4, n (%)	0 (0)	14 (42.42)
Grade 5, n (%)	0 (0)	1 (3.03)

N=total number of women in the sample; n=number of women; SD=standard deviation. PFDI-20=short form Pelvic Floor Distress Inventory; POPDI-6=Pelvic Organ Prolapse Distress Inventory subscale; CRAD-8=Colorectal Anal Distress subscale; UDI-6=Urinary Distress Inventory subscale.

Improvements in organ position and shape observed through clinical assessment were corroborated by women's self-reported symptoms and function. The baseline mean PFDI-20 Total score was 98.77 (SD 42.43) reducing to 49.87 (27.28) after final treatment. The mean reduction in PFDI-20 Total score was 47.46 (SD 33.31). Pelvic floor strength was observed to improve during treatment and Modified Oxford Grading Scale sore was observed to increase from mean 1.28 (SD 0.85) at baseline to 3.33 (SD 0.78) after final treatment. The pelvic muscles treated most frequently during therapy were puborectalis (29/33, 87.88%), pubococcygeus (27/33, 81.82%), iliococcygeus (13/33, 39.39%), and the perineum (12/33, 36.36%). A large proportion (28/33, 85%) of women presented with birth-scars, and of these women in 22/33 (66.67%) cases it was identified that the birth scar was a significant source of tissue stiffness affecting pelvic organ arrangement.

Discussion

The aim of the current study was to better understand the potential benefits and limitations of BFT for pelvic organ prolapse. The mean reduction women's self-reported symptoms (PFDI-20 total score) from baseline to after final treatment was 47.46 (SD 33.31) points following mean 6.06 (SD 2.28) treatments. These results represent a potentially greater change in symptoms than has been reported following PFMT, which at best has demonstrated a mean reduction of 18.3 points in PFDI-20 total score [21]. The current study also showed the potential benefits of BFT in improving organ position, with 27/33 (81.82%) women assessed to have improved by at least one prolapse stage. Research studies investigating the benefits of PFMT have not yet demonstrated improvement in prolapse stage [18-21]. The results of the current study suggest that a clinically meaningful reduction in prolapse symptoms and improvement in organ position may be achieved following a short course of BFT and that this approach could potentially offer improved outcomes to the standard strength-training approach. The longer-term outcomes following BFT, however, are yet to be examined. In the current study, all women were advised to stop PFMT at the beginning of treatment. This is in keeping with the recommendations of Fitzgerald & Kotarinos [60] and Stein & Hughes [54] to avoid the use of PFMT for patients with pelvic floor hypertonicity. We observed during this study that despite stopping PFMT, most women experienced improved pelvic floor strength, with a mean improvement in Modified Oxford Grading Scale function of 2 grades. This indicates that initial impairment of pelvic floor strength in the current sample may have been related to excessive stiffness within the pelvic structures rather than weakness of the pelvic floor muscles. The observations from the current study compare favourably to the changes in pelvic floor

function observed in previous PFMT focused trials [61-63]. These findings, that pelvic tissue stiffness may play an important role in this condition, are relevant to all women's health professionals treating prolapse. The findings also question the current received wisdom that that POP is caused by weak pelvic tissue and that strengthening vaginal muscles is necessary. In the current study it was observed that the majority (85%) of women presented with pelvic floor scarring from episiotomies or tears, and that for many women scar tissue was a significant source of tissue stiffness. Scarring increases stiffness, reduces tissue mobility [64], and causes a resistance to stretch [65], which disrupts biotensegral equilibrium, alters tissue arrangement, and affects function [66]. The current study offers preliminary evidence of a relationship between birth-related scarring and pelvic tissue stiffness, which we argue may be a factor in the development of pelvic organ prolapse for some women. It is estimated that 90% of women experience tears and scarring following childbirth [67] and the use of episiotomies is a contentious issue [68, 69]. Birth-related scarring has previously been associated with pelvic tissue stiffness and is indicated as a significant factor in persistent postnatal problems [70-72]. The findings from the current study may also have relevance to obstetrics, as practitioners caring for birthing women need to be mindful of the impact that birth trauma and scars could have on pelvic tissue stiffness.

The current study presents outcomes following a new treatment for POP that has been created based on the biotensegrity model for understanding human structure and function. Within this model, prolapse can be seen as an adaptation that the body makes to compensate for injury, scarring or adhesions within the pelvis. Where injury is present the distribution of forces within the body will change. These forces will flow along the path of least resistance and this can lead, over time, to a change in tissue arrangement [73]. This alteration in tissue arrangement can have a protective function, ensuring forces are transmitted through those structures best suited to handle them, while offering some protection for those whose primary function is not force transmission [42]. A biotensegrity orientated understanding of POP is in its infancy and further research is needed to better understand the nature of the tissue damage that occurs with pelvic floor injury and how this is related to the structural changes observed with POP.

The traditional use of pelvic floor strength training to treat POP has shown limited success and surgery for POP has notoriously high failure rates. It is vital that interventions for gynaecological conditions should be based upon up-to-date modelling of global support mechanisms. If we choose not to update our treatments in line with current anatomical science, we are doing women a disservice. Biotensegrity focused research provides a strong foundation in explaining human structure and function [29, 30, 74] and case studies examining its integration into therapeutic practice are showing promising results [46, 75, 76].

The data presented in this current study demonstrates that clinically meaningful improvements to prolapse symptoms can be achieved through the assessment and treatment of excessive pelvic tissue stiffness. We have observed improvement in organ position for all women receiving biotensegrity focused therapy and women have corroborated these findings by reporting improvements in symptoms and function. We hypothesise that excessive pelvic tissue stiffness may have a causative role in pelvic organ prolapse and recommend clinical research further investigates this relationship.

Limitations

Whilst a clinical case series is an important early step to explore the potential benefits of this new therapeutic approach, it is important that the results are understood within the context and limitations of this methodology. There are several potential sources of bias that should

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be considered when interpreting the findings from this current study. For example, all participants were assessed and treated by the lead author (AC) in a single private healthcare setting. As the treatment is a new approach for treating pelvic organ prolapse it is only currently available privately to women who self-refer for treatment and it is not a requirement that women to have sought an independent diagnosis prior to the start of treatment. As such, four women in the current study self-referred for treatment based on symptomatic experience of prolapse (e.g., vaginal bulge, chaffing, urinary leakage) and did not obtain an independent diagnosis from a general practitioner or gynaecologist. Whilst we have observed a mean reduction in self-reported symptoms with a clinically meaningful change in score, the current study includes only a small sample of women and there is no control group. Therefore, it is not possible at this early stage of research to be confident that the observed changes would be statistically significant to a non-intervention group or that the observed changes are a direct result of this new therapy. This can only be confirmed following an appropriately powered randomised controlled clinical trial.

Summary

From the data presented in this case series and our previous clinical study [46] we have observed that a relatively small number of treatments focusing on releasing pelvic floor stiffness could offer benefit to women living with pelvic organ prolapse. We have observed clinically meaningful improvements in women's self-reported pelvic organ function alongside improved shape/position of pelvic organs during therapy and suggest that BFT may be a feasible conservative treatment option for women with moderate to severe prolapse. We propose that the underlying pathophysiology of pelvic organ prolapse is likely to be excessive pelvic floor stiffness rather than weakness and we recommend clinical research is undertaken to test this hypothesis.

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