# Mensendieck somatokognitiv terapi for kvinner med kroniske underlivssmerter

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*Fagartikkelen er en dobbeltpublisering av Introduction og sammendrag fra studiene i doktorgradsavhandlingen: Somatocognitive therapy of women with gynecological unexplained chronic pelvic pain.*

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**Abstract**

**Somatocognitive therapy of women with gynecological unexplained chronic pelvic pain**

Chronic pelvic pain (CPP) is a common cause of infirmity (an imperfection or weakness) among women. No effective treatment is available. Aims of this thesis were to 1) study the motor patterns of posture, movements and coordination, gate, sitting posture and respiration in women with chronic pelvic pain and 2) study the effect of Mensendieck somatocognitive therapy (MSCT) compared to gynecological therapy as usual to 3) develop an evaluation instrument designed to assess motor patterns.

A standardized Mensendieck test (SMT) was developed to assess motor patterns. Inter-rater reliability and validity were tested in a sample of 15 women with CPP and 15 controls. 40 women with CPP were recruited. The patients were examined by a gynecologist, a psychologist and a physiotherapist using the SMT. A visual analogue score of pain (VAS) and a self-rating of distressing psychological symptoms, general well-being and function (GHQ-30) were obtained.

The patients were randomized into two treatment group: (1) standard gynecological treatment (STGT) and (2) STGT + Mensendieck somatocognitive therapy (MSCT). Group 1 received standard gynecological advice. Group 2 received 10 treatments sessions with MSCT. After the three months treatment periods was completed a new gynecological, psychological and a Mensendieck examination was conducted, including a second SMT and VAS: The same examination was performed one year after the inclusion adding GHQ-30.

Good intra class correlations ($ICC_{1,1}$) were found (0.83-0.97). SMT discriminated well between women with CPP and the healthy controls. After three months the STGT group had no significant change in performance of the SMT. MSCT group scored significantly higher after 90 days of treatment in all aspect of the SMT. In the STGT group VAS was reduced 7.8%. In the MSCT group the VAS was reduced by 50%. Nine months after treatment these effects of treatment remained and even improved. A reduction in GHQ-30 scores in the MSCT group was found, but not in the STGT group.

## Introduction

*Chronic pelvic pain*

Chronic pelvic pain (CPP) in women[1] is defined as lower abdominal pain unrelated to pregnancy that has lasted for at least six months. The pain may be described as dull aching, sharp, cramping or a feeling of painful pressure or heaviness deep within the pelvis. Pain during intercourse is rather common, and some experience pain while having a bowel movement or even when they sit down. Lifting heavy burdens or movement often increases the pain, and the pain may intensify after standing for long periods and may be relieved when the person lies down. The patients often think the origin of the pain is due to a disease or dysfunction in the genital organs such as the uterus or the ovaries. The majority claim that the pain is worst during the second part of the menstrual cycle. Extraordinary frequent urination (pollakuiria) may occur, and some degree of menstrual disturbance is not uncommon. However, pain occurring exclusively around menstruation (dysmenorrhoea) or with intercourse (dyspareunia) is excluded from the definition (Zondervan 2001). CPP is severe enough to require medical or surgical treatment (Howard 2003). Years of disability and suffering are common outcome (Jaimeson & Steege 1996, (Horwitz-Stern & Smolin 2006).

The exact point prevalence of chronic pelvic pain in the female population is not known, but consultations recorded in UK primary care show that the prevalence of CPP was 3.8 % in women aged 15-73, a number higher than the prevalence of migraine (2.1%) and almost similar to those of asthma (3.7%) and low back pain (4.1%) (Zondervan et al. 1999, Howard 2003, Warnock & Clayton 2003). Up to 40% of women consulting gynaecologists complain of chronic pain in the lower abdomen. Fertile women more often report this type of pain than menopausal women (Zondervan 2001, Grace & Zondervan 2004, Duffy 2001).

It has been estimated that women with chronic pelvic pain use approximately three times more medications of any type than healthy women, and the most commonly used health resource overall was pain medication (Mathias et al. 1996). The resulting costs for health service are considerable, amounting to USD 880 million per year

[1] Medically unexplained chronic pain in the pelvic area also occurs in males (Cornel et al 2005, FitzGerald 2005, Anderson et al. 2005, 2006, and Giubilei et al. 2007). «Prostatitis» is an alternative diagnosis sometimes used for CPP in males (Bergman & Zeitlin 2007). We have not addressed CPP in male patients in this study.

in the US alone (Mathias et al. 1996). The women suffering from CPP present a major challenge to health care, and the lack of treatment success in spite of high costs is frustrating.

Gynaecological examination may reveal endometriosis[2], uterus pathology, ovarian cysts or peri-ovarial peritoneum irritation as the cause of CPP. However, gynaecological dysfunction or diseases is frequently not found, and about 80 % of the patients with chronic pelvic pain have a negative laparoscopy[3]. Thus most authors underscore the need to consider non-gynaecological causes of these chronic pain disorders (Slocumb et al. 1984, Beard et al. 1988, Baker 1993, Gunter 2003, Hetrich et al. 2003, Shaeffer 2004, Winkelstein 2004, Jarell 2004). These include disorders that affect the bladder and other parts of the lower urinary tract, diseases of the large bowel, disorders of the lower spine, lumbar plexus, sacrum and pelvis (table 1). Occasionally one of these disorders is present, and treatment may be curative. However, even when syndromes or disorders of these organ systems are adequately handled, chronic pain may still persist. Some authors limit the definition of CPP in women to such biomedically unexplained CPP only (Grace 1995, Ehlert & Heim 1999, Bodden-Heidrich et al. 1999, 2001, 2004, Sidentopf & Kentenich 2004, Berberich & Ludwig 2004).

From a classification point of view, biomedically unexplained pain, including chronic pelvic pain, will in most cases be included in the concept «persistent somatoform pain disorder». International Classification of mental and behavioural Disorders (ICD-10) define such pain as a «persistent severe and distressing pain (which) cannot be explained by evidence of a physiological process or a physical disorder, and the pain is consistently the main focus of the patient's attention» (F.45.4) (WHO 1993, page 108). Accordingly, in CPP no correlation has been found between reported pain and somatic pathology (Ehlert & Heim 1999). However, the pain is worsened or occurs in association with emotional distress, conflicts or psychosocial problems (ICD-10 1992, Anonymous, IASP Task on Taxonomy 1994, Sharpe & Carson 2001). By ICD-10 definition, somatoform persistent pain should not occur in the presence of schizophrenia or related disorders, or only during any of the mood disorders; somatization disorder (Briquets syndrome) or hypochondriacal disorder.

**Table 1**. Some non-gynecological somatic disorders reported to be assosiated with CPP.

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|---|
| Interstitial cystitis |
| Chronic relapsing urinary tract infections |
| Irritable bowel syndrome |
| Diverticulosis |
| Inflammatory bowel disease |
| Neural affection |
| Post surgical |
| Vertebral disc herniation |
| Neoplasms affecting nerve roots or plexa |
| Joint and/or muscular affection of the sacrum or pelvis |

If the patient reports other bothering biomedically unexplained somatic symptoms as well that has lasted for several years and pain is not dominating symptom – and there is a refusal to accept medical reassurance that there is no adequate physical cause for the physical symptoms – the patient may qualify for the diagnosis undifferentiated somatoform disorder.

In parallel with the concept of alexithymia (the lack of ability to feel or express emotions), women with chronic pelvic pain often lack normal quality of sensations, exteroceptive as well as proprioceptive (Haugstad 1999, 2000, Kirste et al. 2002). Thus they often lack the ability to express themselves in a functionally normal body language, a process that also may be called «alexisomia» (Kanbara et al. 2004). The patients may also sometimes be characterized by an inability to integrate such sensory impressions with concurrent emotions and cognitions, suggesting that dissociative processes also may occur in CPP.

*Pain*

Pain is a unique experience that is perceived differently by everyone. The spectrum of conceptions of pain may be illustrated by the following two definitions: The first: «Pain is whatever the experiencing person says it is, existing whenever she says it does» (McCaffery 1968, McCaffery & Pasero 1999, Crooks 2002). This definition acknowledges the uniqueness of pain and makes the patient's self-report the key to pain assessment (Crooks 2002). The other definition, used by the International Association for the Study of Pain (IASP), states that: «Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage» (Merskey & Bogduk 1994). This definition states the complexity of pain and the existence of both a physical and emotional component to pain.

Pain can be acute or chronic. Acute pain is usually short-lived and subsides as healing progresses. The acute pain generally responds well to analgesics, and the anatomy and physiology of acute pain is generally understood, and we are able to manage acute pain effectively (Crook 2002, Gallagher 2005, Melzack 2005). Chronic pain is generally referred to as lasting longer than 6 months, and may be persisting, intermittent, recurrent or continuous (Breen 2002). In general, prior events in life, either physical or psychological, seem to change the response to pain, either amplifying or diminishing it. The evaluative or cognitive component is influenced by past experience with pain. Every new episode or change in pain intensity, character or localization activates cognitive processes and emotions that are influenced by the current context and meaning, which are affected by past pain experiences (Crook 2002, Green 2004, Ursin 2005). In contrast to our ability to manage acute pain, the management of chronic pain often presents a daunting challenge to clinical practice.

In chronic pain the pain threshold is often reduced. The mechanism often referred to, is that signals from the afferent myelinated fibres of the dorsal roots activate spinal neurons normally activated by the thin, unmyelinated nociceptive fibres, second to the plastic changes in spinal and supraspinal structures referred to above, like «memory traces» conveyed by long term potentiation and similar mechanisms. Minimal stimuli thus lead to the same type of pain that has earlier been associated with painful stimuli. Co-localization of stimuli in space (from anatomical structures adjacent to each other) or time (repeated stimuli) is also conducive of pain formation.

There also seems to be a genetic susceptibility to development of chronic pain syndromes (Kirste et al. 2002). Further, there seems to be an increase in both chronic pain and anxiety in depressed patients, the symptom load increasing with increased severity of depression (Ohayon & Schatzberg 2003,

[2] A condition in which tissue more or less perfectly resembling the endometrium* occurs outside the uterine cavity, usually in the pelvic cavity.
*Endometrium: the mucous membrane lining the uterus.

[3] A surgical procedure in which a tiny scope is inserted into the abdomen through a small incision.

Silverstein 1999, 2002). This phenomenon may be attributed to the influence of affective symptoms on the «relay stations» such as the thalamus and amygdala. Such phenomena, often referred to as «gating» of signals, occur at different levels on the signal route from dorsal roots to cortex (Campbell et al. 2003). Sensitization can be understood as an increase in response to a stimulus as function of repeated presentations of that stimulus. Increasing evidence is accumulating in support of the notion that physiological mechanisms of sensitization play an important role in the development of chronic pain syndromes as well (Russel et al 1994, Banic et al 2004).

The lack of an explanation of the causes of the pain can be frightening and frustrating. This can contribute to increased perceived stress and negative interpretations of the symptoms, which in turn may sensitize body and mind (Ursin 1997, Eriksen & Ursin 2002, Lidbeck 2002). Pain behaviour can be considered as a behavioural response to this process. Pain behaviour in chronic pain states is different from the behaviour of acute pain (Breen 2002, Weiner 1999). It can be categorized into expressive behaviours, movement behaviours and functional behaviours. The effects of living with chronic pain adversely alter life patterns, resulting in negative physical, psychological, and social effects.

*Comorbidity of chronic pain*

Chronic pain is in most instances associated with other physical or mental symptoms or disorders (e.g. depression). Psychological modulation of pain is of great importance (Apkarian et al. 2005). For example, negative emotional states have been shown to enhance pain-evoked activity in limbic regions, such as the anterior cingulate and insular cortixes (Philips et al. 2003). Further, the anticipation or expectation of pain, activate pain-related areas (see for example Villemure & Bushnell 2002). These facts have led to the development of more complex pain theories. Neuroimaging studies of the human cortical and subcortical physical pain response have identified a neural network consistently referred to as the «pain matrix» (Kelly 2006).

The brain areas that are normally referred to, include the mid/anterior insula, anterior parts of the cingulate cortex, the orbitofrontal cortices and the frontal pole, amygdala and hypothalamus, in addition to the periaqueductal grey matter (Chang 2005, Kulkarni, 2005). It has been hypothesized that activity in the pain inhibition circuits (including those of the corticopontine projections) are reduced when pain is facilitated, together with activation of the limbic and paralimbic circuits (Chang 2005). In a recent study, Kelly et al. (2006) even describe that left caudal anterior cingulate cortex and the left inferior frontal gyrus are activated in persons retrieving autobiographical memories of painful events. Such findings clearly have implications for the understanding of disease mechanisms of chronic pain. Contemporary development in theories of physical therapy and rehabilitation also take these new insights from the neurobiology of pain into consideration in the theoretical frameworks of understanding of chronic pain (Moseley 2003).

However, additional physical distress symptoms are frequently reported as well by patients with chronic pain including CPP. Ehlert & Heim (1999) found CPP patients were suffering from variety of unexplained bodily symptoms in addition to lower abdominal pain such as vague, diffuse, or overlapping symptoms involving the genitourinary, gastrointestinal, and musculoskeletal systems. They conclude that somatic examinations should not only focus on the predominant pain, but also on the additional complaints. Baker (1993), Hetrich et al. (2003), Fitzgerald & Kotarinos (2003) and Tu et al. (2005, 2006) all described musculoskeletal dysfunction in patients with CPP. Beard (1988) described accumulation of tissue fluids in the hypogastric and inguinal regions. King (1991) described that these patients even had posture and gait disturbances.

These reports strongly indicate that CPP in most women is a syndrome affecting more than the pelvic area, in particular muscular tension, respiration and functions such as movement and gait. However, despite these reports we are not aware of any study which in a systematic and reliable way has assessed these body functions in women with CPP.

*Assessment methods of posture, movement patterns and body awareness*

In order to study posture, movement patterns, and body awareness in women with chronic pelvic pain, the need for a standardized instrument to assess motor functions of the patients and the effect of therapy is apparent. Several instruments to measure motor functions have been developed in the Nordic countries over the course of years. Wilhelm Reich, who stayed in Norway in the 1930s, emphasized the close relationship between repressed emotions and posture, respiration, movements and consistency of muscles (Reich 1968). Following discussions with Reich, the psychiatrist Braatøy and the physiotherapist Bülow-Hansen collaborated to develop the Norwegian psychomotor physiotherapy from the principles formed by Freud and Reich (Bunkan 2001, Bunkan et al. 2002, Bunkan et al. 2003). They also developed a tradition of body examinations.

The most extensive examination is the «Global Physiotherapeutic Muscle Examination» (GPM) developed by Sundsvold and co-workers (1982, 1985). The GPM provides somatic information on the impairment level, and through a scoring system, information about degree of problems (Kvåle et al. 2002, Kvåle et al. 2003a, Kvåle et al. 2003b, Kvåle 2003c, Kvåle et al. 2005). In its most common version it consists of 78 items that cover five main domains: Posture, Respiration, Movement, Muscle and Skin (Kvåle 2003c). The test takes at least 45 minutes to perform (Sundsvold et al. 1982, Sundsvold et al. 1985, Kvåle 2003c). Kvåle herself suggest, «a less time-consuming and sounder test battery could be developed, suitable for patients with long-lasting musculoskeletal pain» (Kvåle 2003c, p.65). In an effort to simplify this very complex test, Kvåle reduced the test battery from 78 to 52 tests (GPE-52), and was able to demonstrate that this abbreviation could be performed without hampering the reliability or different aspects of the validity (Kvåle 2003c). In spite of this effort to reduce the test size and the amount of time it takes to perform the test, GPE-52 still is quite comprehensive and takes at best 30 minutes to perform. Moreover, in the GPE-52 test passive elements are dominant, even though it also contains of some active movements performed by the test subject.

Another body examination also developed from psychomotor physiotherapy, with many features similar to the GPM, is the «Comprehensive Body Examination» (CBE) developed by Bunkan and co-workers (Friis et al. 1998, Bunkan et al. 1999, Bunkan et al. 2001, Bunkan et al. 2002, Friis et al. 2002). Bunkan describes CBE as a refinement of an earlier clinically based body examination (ROBE). Fourteen psychometrically sound sub-scales have been developed: two for posture, five for respiration, three for movements and four for muscular consistency (Bunkan 2003). The examination takes about 3/4 hour to perform (Bunkan et al. 2002). GPM and CBE are somewhat similar in that they measure ranges of movements and resistance to passive movements in upright and supine positions (Bunkan 2003).

«Body awareness therapy» (BAT) has been independently developed in Sweden

(Roxendal 1985). The main aim of this therapy is to integrate the body in the total experience of the self and to restore body awareness and body control (Roxendal 1995). One important aspect of this therapy is the focus on the patient's awareness of sensations and emotions in the body (Gard 2005). This therapy tradition developed the Body Awareness Scale (BAS) to evaluate the effect of the BAT in patients with chronic schizophrenia. The scale has been developed to evaluate the physical as well as the psychic functions of the patient (Bunkan 2003). Roxendal also developed the Body Awareness Scale-Health (BAS-H)[4] (Roxendal 1995, Gyllensten et al. 1999, Gyllensten et al. 2004). The purpose of this scale is to assess patients with psychiatric and psychosomatic diseases, and body empathy in healthy individuals (Roxendal 1985, 1995). The scale (BAS-H) has four main domains (Grounding/center line index; Centring/breathing index; Flow index and Additional items index) with a total of 26 sub-indices. The test takes about 30-40 minutes to perform. The BAS-H is strongly connected to a specific theory, however, with focus on psychiatric dysfunction. Accordingly to Gyllensten, «Part of the theories of basic BAT and the body ego, defined by Roxendal, are used to analyse the movement function and behaviour with regard to the relation to the ground and the centre line, centring of movements through the movement centre in the solar plexus, freedom of the breathing and the flow of movements throughout the body by the use of the BAS-H» (Gyllensten et al. 2004).

An observer rating scale scoring system called Body Awareness Rating Scale (BARS) was developed by Skatteboe mainly to assess movement harmony, and the purpose was to evaluate the treatment process of Body Awareness Group Therapy for patients with personality disorders (Friis et al. 1989). Twelve items in this scale refer to postural stability, centring, free respiration and mental presence, and this scale is developed from Roxendal's BAS-H.

Other body oriented treatment methods also exists, like Feldenkrais, Alexander technique, yoga body awareness therapy etc. (Jain et al. 2004, Schlinger 2006), but these traditions do not include instruments of evaluation of body functions.

This review indicates that there could be a need for a new instrument that can be used to assess the quality of movements according to principles derived from functional anatomy. Such an instrument should allow therapists thoroughly trained in observation and visual analysis of the quality of movements to rate different static and dynamic motor patterns including respiration and gait. In a test based on such dynamic principles, items addressing palpation of muscular consistency and passive movement or handling by the therapist can be excluded. The main focus can be on active movements performed by the patients (Haugstad 2000, Wojniusz 2006). By concentrating on the visual analysis of simple movements, the test should be easy to perform only requiring a few minutes and also be easy to video record for training and inter rater reliability purposes.

*Gynecological treatment of Chronic Pelvic Pain*

Gynecological treatment of chronic pelvic pain may include a variety of measures. Prescription of pain relievers is common, but rarely will a medication be the solution of chronic pain. Even if there are no symptoms or signs of depression, it is also rather common to prescribe antidepressants such as amitriptylin due to their analgetic effects. If the pain has a cyclical pattern, hormone treatments such as birth control pills or other hormonal medications may be prescribed. If an infection is suspected as the source of the pain, antibiotics are used. Physical therapy by means of applications of heat and cold to the abdomen, stretching exercises, massage and other relaxation techniques, or transcutaneous electrical nerve stimulation (TENS) therapy may be tried as well. If tender points are localized, a possible treatment option has also been direct injection of a long-acting local anesthetic into the painful spot (trigger point). In the more severe cases nerve ablation or even surgery (intra abdominal tissue ablation, hysterectomy) has been conducted (e.g. Learman et al. 2007). Most gynecologists also offer different kind of counselling.

However, there is a paucity of studies showing clinical improvement of CPP due to these types of intervention (Tu et al. 2005). In another review of all studies on the management of chronic prostatitis/chronic pelvic pain syndrome until 2006, Dimitrakov et al. (2006) similarly concluded that «no universally effective treatment is available that can provide significant lasting benefit for chronic pelvic pain syndrome». Thus women with CPP are often told that no gynecological pathology that may explain their pain has been found (Grace 1995, Duffy 2001), and that no effective treatment is available.

*Current treatment strategies of chronic pain*

Faced with such negative statements from evidence-based reviews, it is reasonable to consider treatment studies of chronic pain in general for new treatment options of CPP. There is evidence that cognitive-behavioural therapy applied by interdisciplinary rehabilitation teams may reduce pain in general (Mayou et al. 1997, Lidbeck 1997, 2002, Turk 2003). Psychological support and cognitive restructuring, explanation of pain mechanism and relaxation techniques often led to constructive coping and reduced suffering in chronic pain patients (Sharpe 1995, Mayou et al 1997, Lidbeck 1997, 2002, Gullacksen & Lidbeck 2004, Linton & Nordin 2006). Results obtained from neurobiological research suggest that cognitive therapy biologically influences central pain dysmodulation (Birbaumer et al. 1994, Lidbeck 2002, Gullacksen & Lidbeck 2004). Thus, Moseley (2003) applies the novel insights from functional brain studies of the cerebral neuromatrix of pain in the approach to treatment of patients with chronic pain. Within this model, pain is a multiple system output that is activated by an individual-specific pain neuromatrix; activated whenever the brain concludes that body tissue is in danger. The therapeutic aspects of the approach focus on reducing the sensitivity and activity of the pain neuromatrix, via reduction of the threat. The key components are educating the patient in the understanding of pain mechanisms and a systematic approach to desensitizing the pain neuromatrix by gradual increments of the load of motor tasks within the pain limits.

Negative emotional states also contribute to dysfunctional pain modulation mechanisms within the central nervous system (Apkarian et al. 2005, Staud & Domingo 2001), and thus, treatment of these states, like major depression, also could be perceived to improve pain modulation and reduce subjective pain experience. Goldapple et al. (2004) describe how cognitive behavioural therapy alters metabolic rates in the cingulate and frontal cortices. Using imaging techniques, other authors have noticed the effect of distraction on the modulation of pain-evoked activity in the anterior cingulate and insular cortices, as well as in thalamic pain-relaying areas (Apkarian et al. 2005, Hofbauer et

[4] BAS-H should be differentiated from Body Awareness Scale which measures somatic arousal (Stegner et al, 1999) and Body Awareness Questionnaire which is an 18-item questionnaire about sensitivity to normal, nonemotive body processes (Shields et al, 1989).

al. 2001). Thus, by building both cognitive and motor approaches into the treatment, by changing the focus from pain to other types of sensation from own body, and focusing on coping of simple motor tasks, one would anticipate the activity in pain neuromatrix brain areas become reduced, in parallel with a desensitization to painful stimuli.

Gullacksen and Lidbeck (2004) provided a narrative therapeutic approach. Based on narrative accounts they explained the patient's experience of chronic pain as an understandable process. The authors stated «the individuals who were diagnosed, found the explanation of pain to be a relief and found themselves at the beginning of a whole new process and a long period of healing (p 151). Once given an explanation of pain (a «pain diagnosis»), the patient developed new understanding and gradual improvement of coping skills» (Gullacksen & Lidbeck 2004). Also several other comprehensive treatment programs of pain include a strong psycho-educational dimension (e.g.Borg-Stein 2006, Osborne et al. 2006, Wigers & Finset 2007).

There are suggestions that a multidisciplinary intervention may be beneficial in the treatment of CPP as well (Rapkin et al. 1987, Kames et al. 1990, Peters et al. 1992, Loeser & Turk 2001, Wesselmann 2001, Greco 2003, Gallagher & Verma 2004, Dick 2004, Gallagher 2005). Women in group treatment based on psychosomatic and physiotherapeutic principles together with cognitive and behavioural therapy experience reduced pain (Albert 1999). Furthermore, reduction in the use of the National Health Service and increases in gainful employment were registered. Other authors, studying multidisciplinary intervention or physical therapy show pain reduction and better functioning in daily life at end of treatment in patients with CPP (Mattson et al. 2000, Nadler 2002, FitzGerald & Kotarinos 2003, Kotarinos 2003, Anderson et al. 2005, Anderson et al. 2006). Randomized controlled intervention studies in this area are, however, still missing.

*Physiotherapy as an integrated part of treatment of chronic pelvic pain*

In the rehabilitation of patients with chronic pain, physical therapy is often a key aspect of treatment for the achievement of functional restoration. Skilled physiotherapy relies on principles of behavioural medicine (Turk et al. 2000). The therapists use positive reinforcement to instruct, guide, and encourage the patient to engage in physical activities that improve strength, endurance and flexibility (Loeser & Turk 2001). A systematic review found that physical conditioning programs that include a cognitive-behavioural approach plus intensive physical training, given or supervised by physiotherapist or a multidisciplinary team, was effective in reducing the number of sick days for workers with chronic back and neck pain (Schonstein et al. 2003 a, Schonstein et al. 2003 b).

Both manual physiotherapy and spinal physiotherapy stabilization program have been reported to be significantly more effective with respect to pain reduction in chronic low back pain patients compared to an active control group (Goldby et al. 2006). In other studies of patients with fibromyalgia, physical therapy has also shown positive impact on patients' general well being, and the patients experienced decreased disability and improved function after physical therapy (Havermark & Lanquis 2006, Wennermer et al. 2006). In musculoskeletal pain disorders several RCT studies have shown promising results in pain and symptom reduction and in self-reported daily functioning improvement (Stuge et al. 2004, Rempel et al. 2006, Maigne et al. 2006, Smeets et al. 2006).

Several studies indicate the effectiveness of similar approaches in other pain conditions as well. In patients with pain related to irritable bowel syndrome (IBS), 12 weeks of basic Body Awareness Therapy (BAT) reduced gastrointestinal and psychological symptoms (Eriksson et al. 2002). Mattson also applied basic BAT as a way of fostering empowerment of women with chronic pelvic pain (CPP), claiming that the women experienced improvement in subjective symptoms after therapy (Mattson et al. 2000). In a non-randomized study of patients with non-specific musculoskeletal disorders, Malmgren-Olsson & Branholm (2002) found larger effect-size in the BAT and Feldenkrais groups compared to regular physiotherapy. However, in a non-randomized study (Kendall et al. 2000) of women with fibromyalgia, better results were obtained with a Mensendieck approach than with BAT. But randomized treatment studies addressing the issue of the most efficient treatment in patients with chronic pain in general or chronic pelvic pain specifically, are lacking.

To sum up, chronic pelvic pain is associated with several non-gynecological symptoms and – as for chronic pain in general – clinical experience and examinations indicate alterations not only in muscle function and gait, but also in respiration and posture. Furthermore, treatment of chronic pelvic pain is extremely difficult and there is a lack of randomized controlled studies showing long-term efficacy. Comprehensive treatment approaches combining physical and cognitive approaches are lacking, despite the fact that such treatments seem promising. This suggests that assessments and treatment based on functional anatomy should be of potential efficacy in the treatment of chronic pelvic pain in women. Mensendieck theory and therapy offers this possibility.

*Mensendieck theory and therapy*

Mensendieck physiotherapy contains many of the fundamental principles of motor learning (Fitts et al. 1967, Gentile 1972, 1998, Higgins 1991, Carr et al. 1998, Facchini et al. 2002, Hodges et al. 2002, Flanagan et al. 2003). The focus is on cognitive awareness of experience in own body, and the process of learning new motor patterns through performing new movement patterns in contrast to old habits (Bugge-Rigault 1989, Soukup et al. 1999, Kendall et al. 2000, Haugstad et al. 2000, Kirste et al. 2002, Klemmetsen 2005, Wojniusz 2006). New motor patterns are developed through three phases:

1) The cognitive phase, where the conscious awareness of the patient is directed towards sensory input from visual, tactile and proprioceptive stimuli regarding own body, and compared to ideal mentations with regard the quality of new patterns sought to be obtained;

2) The associative phase where a consciousness gradually develops that integrates the new ideal patterns with new sensory input from the body; and

3) The automatized phase – where the new and more efficient or functional motor patterns are utilized without conscious thought, and gradually integrated into behavioural patterns in the activities of daily life.

Thus, important basic elements are sensory awareness of own body, conscious cognition of new ideomotor patterns and integrations of the new experience into everyday functions (Mensendieck 1954).

The treatment session always starts by describing a possible explanation of the reported symptom and a dialogue between the therapist and the patient with regards to new body experiences. The therapist teaches the patients about the mind/body relations and the pain mechanism, in line with the principles of essential cognitive pain education that Lidbeck recommends (2002).

Mensendieck therapists are trained to assess motor function both in terms of global quality of movement and in the detailed function of every muscle group in the body (Mensendieck 1937, 1954, Haugstad et al.

2000, Kirste et al. 2002, Klemmetsen 2005). Thus, it can be said that the Mensendieck tradition is founded on the principles of functional anatomy. However, Bess Mensendieck was also deeply aware of the fact that the generation of movements is a mental task, and that this task could be brought to conscious attention by mentally rehearsing the movement ahead of time, before the physical execution of the movement proper. Thus, the training programs start with the «teacher» and «pupil» imagining («sketching») the movement to be practiced (Mensendieck 1927, 1937, 1954). In physiologic terms, this preparation for movement involves several areas frontal to the primary motor cortex (Facchini et al. 2002, Flanagan et al. 2003, Andersen 2003). This form of ideomotor preparation of the movement proper, called «motor templates», have been shown to enhance motor learning (Fitts 1954, Faccini et al. 2002, Flanagan et al. 2003). The focus on the cognition preceding movement, as well as the focus on practicing new motor patterns in the activities of daily life, can also be said to be more in keeping with cognitive therapy, developed by Ellis, Beck, Freeman and others (Beck 1976, Freeman 1987, Reinecke 1996). The new motor learning changes the focus from pain to coping and will reduce the threat (Moseley 2003).

An additional important aspect of Mensendieck therapy is focus on the state of tension of a specific group of muscles or agonist. The patient's awareness is guided towards increase of tension in the muscle (maximal contraction) and the decrease of tension (maximal relaxation). This awareness of tension and relaxation is also sought to be automatized into the movements of daily living, much in keeping with the principles of «applied relaxation» (Öst 1987).

Similar to patients in cognitive therapy, the patients treated by a Mensendieck therapist are always assigned graded tasks to be practiced several times each day, preferably while performing the activities of a normal life (Mensendieck 1927, 1954). Thus, the new motor programs are sought to be automatized and internalized in the patient including the pattern of tension and relaxation of agonist and antagonist muscle groups. Further, the Mensendieck physiotherapy trainees are taught in a systematic way to be aware of own bodily experience, thus developing a high level of body awareness themselves, an awareness always sought to be transferred to the «pupil» or the «patient» (Mensendieck 1954, Rigault 1989, Soukop 1999, Haugstad 2000, Kendall et al. 2000, Klemmetsen 2005, Wojniusz 2006).

The mental aspects of the effort it takes to change deep-seated motor patterns are sometimes underestimated. In the Mensendieck tradition, this focus has been quite clear from the original works of Bess Mensendieck. However, the mental parts of therapy may at some points in time have caught less attention than the biomechanical and anatomical aspects of the tradition. In our opinion, it is the integration of mind and body that are so characteristic of this tradition within physical therapy. And it is this integrative approach that we have sought to bring to attention in our work within the field of psychosomatic medicine. Thus, to underline the cognitive aspect of Mensendieck therapy and remind the reader to keep the mental aspects of the therapeutic approach conscientiously, we prefer the term «somatocognitive therapy» as label of the treatment approach that we apply in this study.

## Aims of the study

*The main aims of this study were to*:

- study the complex motor patterns of posture, movements and coordination, gait, sitting posture and respiration in women with chronic pelvic pain and
- study the effect of Mensendieck somatocognitve therapy on these and other outcome variables.

*As a part of this effort, the aim was also to*:

- develop an evaluation instrument specifically designed to asssess posture, movements and coordination, gait, sitting posture and respiration.

## Summary of papers

**Paper I**:
«Reliability and validity of a standardized Mensendieck physiotherapy test (SMT)» (Haugstad et al. 2006, a).

*The aims were to*:

- Develop a Standardized Mensendieck Test (SMT) to evaluate posture, movement, sitting posture and respiration in women with chronic pelvic pain.
- Assess the inter-rater reliability of experienced Mensendieck trained physiotherapists in the evaluation of women with CPP and healthy women.
- Examine whether the posture and movement patterns of women with CPP differ significantly from healthy matched controls.

*Results*
The SMT showed good discriminative ability when examining these two groups. Patients with CPP scored significantly lower than the controls on every subtest. In particular, scores were low for movement (coordination), gait (rotation of the pelvis relative to the spinal column) and for respiration (respiratory response on pelvic lift). The values ranged between 0.83 (posture, subscores for position of the back, 95 % C.I. between 0.63 and 0.92) and 0.97 (respiration) in the evaluation among the raters (Paper I). The power of the Mensendieck assessment technique to discriminate between patients with CPP and the controls was calculated and the sensitivity and specificity of the test was good to excellent. Despite the fact that the testing was blinded with regard to the the test subjects status, we found that the agreement among the testers was generally better when assessing patients than when assessing the healthy controls.

**Paper II**:
«Posture, movement patterns, and body awareness in women with chronic pelvic Pain» (Haugstad et al. 2006, b).

*The aims were to*:

- Examine the posture, and movement patterns in women with chronic pelvic pain, using the SMT examination.
- Compare the typical movement pattern in CPP patients to that of healthy women.
- Describe the body awareness in women with chronic pelvic pain after a clinical interview.
- Describe the apparent pattern of muscular tension, elasticity and tenderness typical of patients with chronic pelvic pain after palpation, found in clinical examination include muscle palpation.

*Results*
Seventy percent of the patients had a history of trauma or infection of the genitourinary region. On a scale from 0 to 10, the average pain score (standard deviation) was 6.01 (1.60). Nearly all patients showed a dissociative pattern, with a lack of contact and control of large body regions. All scores for posture and movement patterns were significantly worse in patients than in healthy women ($p < 0.01$). The largest difference in scores between the groups was found for gait, movement and respiration. For gait, we observed a careful gait with short steps and almost no foot propulsion, and a markedly

reduced hip extension in the propulsion phase. Accordingly, gluteal muscles were poorly developed. The rotation of the pelvis was barely visible. Propulsion differed by 42% and rotation differed by 39% from those of healthy women. For movement, the greatest deviation from the normal pattern was found for tests that posed a demand on balance and coordination. For instance, in the test for hip flexion, the patients had great difficulty standing on one leg for 10 s, scoring 38% below that of healthy controls. For respiration, the typical finding was high costal respiration with almost no movement in the thorax or in the abdominal area. Further testing respiration, the scores of the subtests pelvic lift and barm lift were 52% less than in healthy women.

**Paper III**:
«Mensendieck somatocognitive therapy as treatment approach to chronic pelvic pain: Results of a randomized controlled intervention study» (Haugstad et al. 2006, c).

*The aims were to*:

- Treat the patients with chronic pelvic pain with Mensendieck somatocognitive therapy and evaluate the effect using the SMT. Evaluate the outcome of a randomized, controlled intervention study, using the standardized Mensendieck test to examine for posture and movement differences before and after three months of treatment.
- Treat the patients with chronic pelvic pain with Mensendieck somatocognitive therapy and evaluate the outcome with respect to the experience of pain as assessed by a Visual Analogue Scale of pain in a randomized controlled study.

*Results*
After 90 days of treatment the CPP patients in the Mensendieck somatocognitive therapy group (MSCT) had significantly improved scores in all subtests of the SMT. The patients receiving standard gynecological treatment only (STGT) for the most part did not show any significant changes of scores. The best treatment response in the STGT + MSCT group was found in the case of scores for respiration. The second group of functions that improved considerably was in the subtests for movement. The patients demonstrated the largest improvement in the movement tests functions designed to demonstrate coordination, and the ability to relax. The average SMT score values after treatment were 4.37 ± 0.38 (up 19.3%) for posture, 4.13 ± 0.38 (up 26.1%) for movement, 4.13 ± 0.39 (up 24.8%) for gait, 4.67 ± 0.36 (up 27.9%) for sitting posture, and a considerable increase to 4.72 ± 0.37 (up 58.4%) in the scores for respiration (paper III).

The patients' subjective experience of pain was assessed by means of a visual analogue (VAS) pain scale. Before treatment, the patients were randomized into the group receiving standard gynecological treatment scored an average of 6.68 ± 0.29 (average ± standard error). After the treatment period of 90 days, the average VAS score was 6.16 ± 0.50, a reduction by 7.8 % (non-significant). The patients in the Mensendieck somatocognitive therapy group scored an average of 5.60 ± 0.40 at baseline. After the 90 days' treatment program, the average score was 2.89 ± 0.40, down by 48.4 % (paper III). This corresponds to an effect size of 1.5 and a number needed to treat (NNT) of 1.9, both based on the VAS scores.

**Paper IV**:
«One-year follow-up study of Mensendieck somatocognitive therapy as treatment approach to chronic pelvic pain» (Haugstad et al., *in press*).

*The aims were to*:

- Compare the effect of three months of somatocognitive treatment one year after inclusion (nine months after end of treatment), using SMT to evaluate motor functions.
- Compare the effect of three months somatocognitive treatment at one year follow-up, using VAS to assess subjective pain experience.
- Compare the effect of three months of somatocognitive treatment using GHQ-30 to assess quality of life, psychological distress etc.
- Thus assess the long term learning effect of the Mensendieck somatocognitive approach to therapy of CPP syndrome.

*Results*
At one year follow up, the tendencies for the performance of the motor functions on a general level was an increased deterioration, even significantly for some of the subtests in the STGT group (paper IV). The patients' subjective experience of pain was assessed by means of a visual analogue (VAS) pain scale. Nine months after treatment the average pain was 6.13 ± 0.39, a reduction by 0,5 % from 90 days (non-significant). In contrast the patients in the Mensendieck treatment group scored an average of 2.21 (± 0.44) at nine months compared to 5.60 ± 0.40 at baseline and 2.89 ± 0.40 after 90 days of treatment. There was a statistical significant decrease in sub-scale scores for coping and anxiety-insomnia-distress in the MSCT-group, but not in the STGT group only.

## What did the thesis show ?

- Mensendieck physiotherapists evaluate posture, movement, gait, sitting posture and respiration with a high level of agreement when using the Standardized Mensendieck Test (SMT). The reliability is better when examining those with CPP than those with no symptoms.
- The performance in all of these subtests is significantly lower in the CPP group than for the healthy controls. Thus the SMT discriminated well between patients with CPP and healthy women. These results indicate that the SMT may be useful in the evaluation of patient's with CPP and other somatoform disorders.
- We found a specific pattern of pain, posture, movements, muscle elasticity and reduced awareness of one's own body in women with CPP. These findings may increase our understanding of this disease.
- Our study demonstrates effect of Mensendieck somatocognitive therapy on the symptom load of patients with CPP. Mensendieck somatocognitive therapy combined with standard gynecological care improved pain experience and reduced psychological distress better than gynaecological treatment alone. It also improved motor functions especially those related to respiration and the general movement.
- We have shown that the effect of Mensendieck somatocognitive therapy in combination with standard gynecological treatment in a group of women with CPP prevails, in that improved motor functions are lasting, and that even further progress takes place nine months after end of therapy. We suggest that this further improvement is due to a learning effect with respect to increased body awareness, reduced fear of movement, and better coping of motor patterns used in daily living.

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