

Research Article

Fibromyalgia as a Variant of High-performing PTSD: Negative affect, Emotional integrity counter play and functional impairment

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Abstract

Objective: The aim of the present analysis was to examine psychological functioning and functional impairment in fibromyalgia (FM) based on three dimensions of post traumatic stress disorder (PTSD), positive and negative affect adjective scales (PANAS), Health related quality of life (SF-36) scales concerning pain, vitality and impairment from emotional and physical and causes together with the Work Ability Index (WAI) and to compare the results to healthy women.

Materials and method: Twenty-two women presenting FM and twenty-six healthy women were education- and age-matched. All the women completed questionnaires regarding background, Impact of Event Scale-Revised (IES-R) and health related quality of life (SF-36), Negative and Positive Affect Scale (PANAS) and the single item Work ability index (WAI).

Result: In comparison to healthy women, women presenting FM showed higher IES-R values of intrusion, avoidance and hypertension and lower values regarding PA and higher values regarding NA. Role emotional (RE), role physical (RP) and vitality (VT) showed lower values respectively and bodily pain (BP) showed more pain during 4 weeks in women presenting FM and WAI showed a higher value in healthy women (all these p values $p \leq 0.001$). Intrusion, avoidance and hypertension correlated but were inversely related to health related quality of life in terms of RE in FM. Only intrusion and hypertension were associated with NA while avoidance showed a positive association to WAI in FM where also the PA and the NA values were correlated unlike in healthy women. BP was related to VT but unrelated to all other measurements in FM.

Conclusion: The absence of links between BP and the other measurements may imply a somewhat non psychological nature of clinical FM pain. Lower PA values and higher NA values added by high levels of PTSD like symptomatology induces severe psychological strain in FM. Avoidance relates positively to WAI but negatively to RE which suggests a pattern of alarming emergency functioning. The result and other research on relentless activity in FM may term FM a variant of high performance PTSD. An investment in areas of psychological resources that need to be filled in in FM may open up for a more resourceful physiological regulation of pain and global self-regulation of e.g. RE, RP.

Keywords: Fibromyalgia, PTSD Affect, Quality of life Functional impairment

Introduction

Fibromyalgia (FM) presents a pain syndrome where the primary symptom is the experience of widespread pain in all

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four quadrants of an individual's body. Without an established etiology, the diagnosis is based on the criteria developed by the American College of Rheumatology which beside the spread of pain include pain duration (>three months) and localization of so called tender points ($\geq 11/18$ tender points) [1]. In Sweden 2-3 % of the population is affected with also a clear predominance in women [2]. Researchers have repeatedly documented associations

between FM and both early and adult life stressful experiences e.g. Walker et al. [3] with in recent years also across two continents transcultural validation of recordings such as these [4]. A further progress in this field is also presented by Hellou et al. [5] who underlines the significance of the less violent form of child abuse in terms of neglect in development of FM. In parallel, Hellou et al. [5] recorded a 37.3% prevalence of Post Traumatic Stress Disorder (PTSD) among FM patients. Analog to a large quantity of findings concerning traumatic experiences preceding FM, the comorbidity between FM and PTSD has been repeatedly established by e.g. Sherman et al. [6] Cohen et al. [7] Häuser et al. [8] or Coppens et al. [9].

PTSD and FM

The symptom profile of post traumatic stress disorder (PTSD) includes persistent re experience of the trauma, avoidance of reminders of the trauma and an ongoing physiological arousal [10]. In parallel, Luxenburg et al. [11] point to that the diagnosis of PTSD is best fitted to the exposure to single incidents and non-interpersonal traumas. Leskin et al. [12] referred risk factors for development of this putative single trauma syndrome in terms of uninhibited automatic responses to trauma and suboptimal regulation of attention. Polack et al. [13] referred to putative risk factors for developing PTSD in terms of subtle executive functioning deficits that stands in the way of lessening reactivity to trauma relevant stimuli and avoidant coping strategies. Furthermore, when PTSD is examined neurocognitively current alcohol abuse and depression are by necessity taken into account [12]. Studying a community sample of women living in New York/New Jersey metropolitan area, Raphael et al. [14] found that FM like symptoms made the probability for PTSD like symptoms 3 times higher six months after the 9/11 terrorist attack. The researchers found also that the measurements of pain symptoms from when the women were contacted prior to the attack did not account for the association between current symptoms of FM and PTSD after the attack. Further, Häuser et al. [8] identified temporal links between PTSD and fibromyalgia symptoms parallel to a recorded prevalence of 43% regarding PTSD in FM. Therewith, the researcher regarded FM and PTSD as potential risk factors for each other while both were associated with antecedent traumatic experiences. Besides temporal links, similarities between PTSD and FM also concern dysfunctional physiological adaptation to various stressor. Both FM and PTSD present an autonomic nervous system (ANS) that is more “fixed” or difficult to influence when compared to healthy volunteers [15, 16, 17] or as to heart rate variability (HRV) and PTSD also with reference to panic disorder [16]. Regarding PTSD analog findings concerns also an unchanged HR from day to night [18] meaning a both increased and chronic cardiovascular arousal. In parallel, FM implies a patterns of sustained blood pressure from day to night thereby being s.c. circadian “non-dippers” [19].

DESNOS

Complimentary to the diagnosis of PTSD, also associated adaptive attempts in the face of trauma could be considered such as Disorders of Extreme Stress Not Otherwise Specified (DESNOS). DESNOS could be described as a comparatively wider self-regulatory deficit foremost in dimensions of regulation of affects and impulses, attention and consciousness, self-perception, interpersonal relationships, somatization and systems of meaning [20]. Importantly, the PTSD associated measure of DESNOS is by Zucker et al. [21] pictured as dys regulation dependent on state and occurs in response to relevant cues in terms of a post traumatic stress reaction.

PTSD, DESNOS, functional impairment and FM

In contrast to FM, PTSD has repeatedly been associated with subtle but potent cognitive difficulties prior to stressful experiences (e.g. Van der Kolk et al. [22]). Simultaneously, in likeness to PTSD [21] FM holds qualities of dissociation [e.g.23] but importantly to dissociation through e.g. absorption by activities “keeping busy” [24] as opposed to perception turning inwards to a “phantasy world” as in PTSD that includes DESNOS [21] with also high scores on the dissociative experience scale DES. Similar to DESNOS as described by Pelcovitz et al. [20] FM implies global self-regulatory difficulties [24-26].

The Unprotected self in FM and dissociation through absorbing activity

From interviews with women presenting FM Wentz et al. [24] presented the psychological construct *Unprotected self*. An *Unprotected self* implied an “undefined” self-reference accompanied by an incapacity handling unpleasant mental or external events including negative affect through efficient psychological means such as situational relevant measures, self-comfort or repression. In a situation of insufficient defense operations avoidance meant dissociation through absorbing activities “keeping busy”. Dissociation also included e.g. a “motoric self” (feeling strong and being motorically active) together compensating for the “candle in the wind” functioning of the *Unprotected self*. Under the strenuous psychological conditions where psychological self-caring measures such as working through or warding off not being sufficiently available, a counterplay of negative affects or stimuli that were ignored caused burdening psychological strain and an ongoing risk of being mentally overwhelmed. Simultaneously, an important coinciding dimension of the *Unprotected self* was *normality* in terms of “striving for loving relationships and self-realisation through creativity... The women could not be said to be emotionally withdrawn or not sociable.”(p. 715) Wentz et al. [24].

Negative affect and Positive affect resources in FM

From experimental design Davis et al. [27] found that positive affect (PA) resources were less available in women presenting FM when compared to a group of women with pain from osteoarthritis

(OA). FM further implied inability to maintain affective boundaries between pain and positive emotion when under stress. In women with OA, pain was unrelated to positive mood during stress but in women with FM pain was negatively related to positive mood [27].

Comorbidity of FM with PTSD, physiological similarities between FM and PTSD, self-regulatory difficulties concerning e.g. affect shared between FM and PTSD with DESNOS, the functioning of *Unprotected self* that includes normality in FM together implies that psychological functioning in FM need to be repeatedly mirrored by new thoughtful sets of instruments also from the perspective of everyday functional impairment.

Aim

The main purpose of the present study was to investigate psychological functioning in FM based on the relationships between three dimensions of PTSD, negative and positive affect adjective scales, Health related quality of life (SF-36) scales concerning Bodily Pain, Vitality, Role Emotional and Role Physical of the together with the Work Ability Index and to compare the result to a gender- and age-matched healthy control group. The ancillary purpose was to study functional impairment in both groups.

Material and methods

Participants

Twenty-five women presenting FM were recruited from primary health care and rehabilitation centers in the region of Västra Götaland (Sweden) all of whom had expressed as interest in participating in the study. The healthy control group was recruited primarily from employees (volunteers) within the health care service, but was complemented with other volunteers in order to obtain for the distribution of age and education level to match that of the women with FM. The age match was made pairwise ± 3 years. Inclusion criteria were female participants, aged 20-60 years with a registered FM diagnosis within the last 7 years. Exclusion criteria were prior trauma to the head, brain damage, severe somatic disease, muscular disease, heart disease or anemia, dependent in personal activities of daily life as well as drugs affecting the heart rate.

The healthy control group were required to confirm their healthy status, and the same exclusion criteria as for the FM patients were used, with one addition: prolonged pain (Table 1).

(Percentages). BMI, Body Mass Index; NA, not applicable

Study design

This was a cross-sectional study comparing two groups and is part of a larger longitudinal study, "Affective, cognitive and defensive interplay in fibromyalgia: from premorbid strain to treatment of somatic manifestations".

Ethics

The study protocol that also included an aerobic submaximal

Table 1. Demographic Characteristics among FM patients and Healthy controls. Values are given as mean \pm standard deviation (SD), median (range) and number

	FM (n=24)	Reference group (n=26)	p-value
	mean \pm SD	mean \pm SD	
Age (years)	49.4 \pm 9.8	48.7 \pm 9.0	0.799
BMI (kg/m ²)	27.3 \pm 6.0	25.1 \pm 3.0	0.113
Pain duration (years)	12.7 \pm 9.6	NA	
Education (n=22/25)			0.967
≤ 9 years	1 (4.5 %)	1 (4 %)	
9-12 years	5 (22.7 %)	6 (24 %)	
>12 years	16 (72.7 %)	18 (72 %)	

exercise ergometer test was approved by the Regional Ethical Review Boards at the University of Gothenburg and consequently designed according to the Declaration of Helsinki, revised 1983. Informed consent was obtained in writing from all the participants and sent to the research group prior to the examinations.

Procedure.

The attending physician for each woman presenting FM was contacted to confirm the FM diagnosis and to certify their appropriateness for inclusion in the study. Demographic data was collected along with questionnaires about Health related quality of life (SF-36), Impact of Events Scale-Revised and Workability that were sent to the home of each participant. Thereafter the participants were assigned to a rehabilitation center to perform a submaximal exercise test where also their body weight and height were registered (for details se Lange et al. [15]).

Instruments

IES-R

The Impact of Event Scale -Revised (IES-R) measures the intensity of complaints during the last 7 days in the dimensions Intrusion (IES-R I) (8 items), Avoidance (IES-R II) (8 items) and Hyper arousal (IES-R III) (6 items). The response alternatives range from 0 to 4. From the Swedish short manual is learned that IES-R concerning PTSD is not a diagnostic instrument but instead indicates current level of complaints, the intensity of symptoms and change in these regards [28]. The use of cut off scores is not recommended [29] but a mean score of 1.89 at one subscale indicates disturbance and a mean score of 1.8-2.0 for the whole scale indicates PTSD. On the scoring sheet the question on which Event the ratings concerned was changed into the plural form Events.

PANAS

The Positive Affect Negative Affect Scale (PANAS) consists

of 10 adjectives in the Positive Affect (PA) and the Negative Affect (NA) dimensions respectively. The response alternatives range from 1=not to 5= Very much. The scales mirror mood level and Affect during /time interval/. In the manuals by Watson et al. [30, 31] and Watson et al. [32] is described that the adjectives describe feelings and mood level. Measurements with the PANAS was further developed by e.g. Norlander et al. [33] where four different personality profiles were created based in the two by two combinations of high and low scores on the PA and NA subscales respectively. The PA and NA scales have not generally been found to be correlated [34].

SF-36

In order to assess quality of life the Short-Form 36 (SF 36) was used. The SF-36 measures health on eight different subscales ranging between 0 and 100 where a higher value represents a higher estimated quality of life [35]. The Vitality (VT) subscale involves the experience of energy or 'pep' or conversely the feeling of being 'worn out' and the Bodily pain (BP) subscale concerns pain intensity and how much pain has interfered with work or houswork both during the last 4 weeks. The Role Physical (RP) subscale concerns limitations regarding work och leisure activities from the perspective of physical causes. In turn, the Role Emotional (RE) concerns limitations regarding work och leisure activities from the perspective of emotional causes [35]. SF 36 has showed to be an appropriate instrument for assessing quality of life in women presenting FM [36].

WAI

Work Ability Index (WAI) [37] single item reads "We assume that your ability at its best, is valued at 10 points. What score would you give your current work? (Tick in the appropriate number, 0 means you can work ability, not work at all, 10 mean you work the best at the moment)."

Data analysis

The effect of study group; women presenting FM and healthy women on the measures IES I, II and III, PA, NA, PE, PF, BP, VT and WAI was examined using one-way ANOVA. A correlation concerning IES I, II and III, PA, NA, PE, PF, BP and WAI was carried out for women presenting FM and healthy controls separately and respectively.

Results

Nineteen women presenting FM and 20 healthy women completed all subscales of the IES_R. Fourteen women presenting FM and 2 healthy women scored above 2.0 points at one or more subscales. As seen in Table 2, when compared to healthy women, women presenting FM showed pronouncedly higher IES-R values in terms of intrusion, avoidance and hypertension. Furthermore, women presenting FM showed lower values regarding PA and higher values regarding NA. Health related quality of life dimensions RP, RE and VT showed pronouncedly lower values in women presenting FM. The health related quality of life dimension BP showed a pronouncedly lower value (more clinical

Table 2. The effect of group in terms of women presenting Fibromyalgia (FM) and healthy women (HW) on measures of Impact of Event scale-Revised (IES_R) concerning complaints in three dimensions of Post Traumatic Stress Disorder; I =intrusion, II= avoidance and III=hypertension together with the positive and negative affect adjective scale (PANAS) with the Positive Affect (PA) and the Negative Affect (NA) dimensions. Four subscales of the Health Related Quality of life Short Form (SF-36) scale mirrored interference from sub optimal health during 4 weeks in terms of Role Emotional (RE), Role Physical (RP) and Bodily Pain (BP). The Work Ability Index single item (WAI) recorded current work ability. Means (with standard deviation presented in brackets) concerning all measures and single items.

Measures	Women presenting FM M(SD)	Healthy women HW M(SD)	Df between groups and between groups	F-value	P value
Blood pressure BLPR					
IES_R I	2.51 (1.02)	1.30 (.90)	1,41	17.299	.000**
IES_R II	2.03 (.84)	1.03 (.98)	1, 39	12.100	.000**
IES_R III	2.24 (1.11)	.72 (.78)	1, 41	26.994	.001**
Positive Affect PA	2.90 (.73)	3.76 (.60)	1, 44	19.035	.000**
Negative Affect NA	2.47 (.77)	1.68 (.42)	1, 45	19.565	.000**
Role Emotional RE	25.39 (43.34)	93.65 (17.06)	1, 40	45.098	.000**
Role Physical RP	10.61 (24.28)	92.86 (23.90)	1, 41	125.139	.000**
Bodily Pain BP	25.27 (14.59)	81.90 (16.65)	1, 45	94.776	.000**
Vitality VT	22.05 (17.37)	69.05 (16.33)	1, 41	83.435	.000**
Workability Index WAI	3.64 (2.3)	8.84 (1.28)	1, 47	176.327	.000**

**P <0.001

pain during 4 weeks) in women presenting FM while WAI showed a pronouncedly higher value in healthy women. The effect of group on all values reached a level of significance where $p \leq 0.001$.

In women presenting FM the intercorrelations between the three subscales of Impact of Event Scale- Revised in terms of intrusion, avoidance and hypertension showed a high value (Table 3). Furthermore, these three subscales were also inversely related to health relates quality of life in terms of RE. (But avoidance showed a borderline positive correlative link to the RP value.) The IES-R subscales intrusion and hypertension were associated with negative affect unlike the subscale avoidance with, instead, a positive association to WAI. In women presenting FM the experience of greater vitality (VT) was associated with more PA and less clinical pain BP. In turn, BP showed no associations to the other health related quality of life measurements (RE and RP) or to the psychological functioning measurements in terms of IES-R. In women presenting FM the PA and the NA values were significantly correlated and NA was inversely correlated with RE.

In healthy women the intercorrelations between the three subscales of Impact of Event Scale- Revised in terms of intrusion, avoidance and hypertension showed a high value (Table 4). The IES-R subscales intrusion and hypertension were associated with NA. All IES-R scales were associated with VT in terms of IES-R symptoms being linked to lesser vitality. Furthermore, in healthy women NA was inversely associated with RE and PA was related to less everyday pain in terms of BP. Unlike women presenting FM, in healthy women VT was associated with WAI.

Discussion

From the between group comparison women presenting FM differed from the age and education matched healthy women in terms of IES-R values with a doubled score concerning intrusion and avoidance and a tripled score concerning hypertension. Furthermore, contrasting readings in terms of a pronounced lower PA value and a pronouncedly higher NA value pictured together a combined low PA affect resource with a burden from a heightened NA which animates a situation of psychological strain.

Table 3 Correlations between the three subscales of Impact of Event Scale- Revised (IES_R) concerning complaints in three dimensions of Post Traumatic Stress Disorder; I =intrusion, II= avoidance and III=hypertension with also the Positive affect (PA) and the Negative affect (NA) dimensions of the Positive and Negative Affect Scale (PANAS) and interference from sub optimal health in terms Role emotional (RE), Role Physical (RP) and Vitality (VT) together with Bodily pain (BP) during 4 weeks from the Health Related Quality of life Short Form (SF-36) scale together with a single item recording current work ability; Work Ability Index (WAI) in women presenting FM.

	IES-R I N	IES-R II N	IES-R III N	PA N	NA N	RE N	RP N	BP N	VT N	WAI N
IES-R I N	1 19	.691** 19	.891** 19	ns 18	.521* 18	-.729** 18	Ns 19	ns 19	ns 19	ns 19
IES-R II N	.691** 19	1 19	.720** 19	ns 18	ns 18	-.593** 18	Ns 19	ns 18	ns 18	.623** 19
IES-R III N	.891** 19	.720** 19	1 20	ns 19	.711** 19	-.661** 19	Ns 20	ns 20	ns 20	ns 20
PA N	ns 18	Ns 18	Ns 19	1 20	-.553* 20	Ns 19	Ns 20	ns 20	.517* 20	ns 20
NA N	.521* 18	Ns 18	.711** 19	-.553* 20	1 21	-.507* 20	Ns 21	ns 21	ns 21	ns 21
RE N	-.729** 18	-.593** 18	-.661** 19	Ns 19	-.507* 20	1 21	Ns 21	Ns 21	Ns 21	Ns 21
RP N	Ns 19	Ns (.435 (.062) 19	Ns 20	Ns 20	Ns 21	Ns 21	1 22	Ns 22	Ns 22	Ns 22
BP N	Ns 19	Ns 19	Ns 20	Ns 20	Ns 21	Ns 21	Ns 22	1 22	.558** 22	Ns 22
VT N	Ns 19	Ns 19	Ns 20	.517* 20	Ns 21	Ns 21	Ns 22	.558** 22	1 22	Ns 22
WAI N	Ns 22	.623** 19	ns 19	ns 20	ns 21	Ns 21	Ns 22	ns 22	ns 22	1 22

Table 4. Correlations between the three subscales of Impact of Event Scale- Revised (IES_R) concerning complaints in three dimensions of Post Traumatic Stress Disorder; I =intrusion, II= avoidance and III=hypertension with also the Positive affect (PA) and the Negative affect (NA) dimensions of the Positive and Negative Affect Scale (PANAS) and interference from sub optimal health in terms Role emotional (RE), Role Physical (RP) and and Vitality (VT) together with Bodily pain (BP) during 4 weeks from the Health Related Quality of life Short Form (SF-36) scale together with a single item recording current work ability; Work Ability Index (WAI) in healthy women.

	IES-R I N	IES-R II N	IES-R III N	PA N	NA N	RE N	RP N	BP N	VT N	WAI N
IES-R I	1 23	.662** 21	.810** 22	ns 22	.461* 22	Ns 16	Ns 18	ns 18	-.711** 18	ns 21
IES-R II	.662** 21	1 21	.623** 20	ns 20	ns 20	Ns 16	Ns 16	ns 16	-.592* 16	ns 19
IES-R III	.810** 22	.623** 20	1 22	ns 21	.615** 21	Ns 17	Ns 17	ns 17	-.606* 17	ns 20
PA	ns 22	ns 20	ns 21	1 25	ns 25	ns 21	Ns 21	.448* 21	Ns 21	ns 24
NA	.461* 22	ns 20	.615** 21	ns 25	1 25	-.634** 21	Ns 21	ns 21	Ns 21	ns 24
RE	Ns 18	Ns 16	Ns 17	Ns 21	-.634** 21	1 21	Ns 21	Ns 21	Ns 21	Ns 21
RP	Ns 18	Ns 16	Ns 17	Ns 21	Ns 21	Ns 21	1 21	Ns 21	Ns 21	Ns 21
BP	Ns 18	Ns 16	Ns 17	.448* 21	Ns 21	Ns 21	Ns 21	1 21	Ns 21	Ns 21
VT	-.711** 18	-.592* 16	-.606** 17	Ns 21	Ns 21	Ns 21	Ns 21	Ns 21	1 21	.576** 21
WAI	Ns 21	Ns 19	ns 20	ns 24	ns 24	Ns 21	Ns 21	ns 21	.576** 21	1 24

When adding the high level PTSD like symptomatology to the situation it appears grave from the perspective of mental load. Additionally, both health-related quality of life dimensions, VT and clinical pain BP, showed a contrasting “third” of the resource in women presenting FM with at the same time a “multiplied” restriction regarding both work and leisure activities due to both emotional and physical causes. Regarding current workability the predominance in healthy women is a “doubled”. These SF-36 and WAI recordings concerning healthy women are in coherence with their psychological functioning recordings and the from sampling procedures concerning (excluding chronic) clinical pain.

Correlative analysis, that was carried out for the two groups of women respectively, showed that concerning both groups that IES-R dimensions intrusion, avoidance and hypertension were highly associated. Simultaneously, only intrusion and hypertension were associated with NA while avoidance seem to offer a refuge in that respect. In women presenting FM avoidance was inversely associated with RE which implies limited satisfactory opportunities in everyday life due to emotional causes. This correlative result further suggests a disadvantage from avoidance concerning the nonexistent correlation with PA in terms of a sacrifice from avoidance of potentially positive and rewarding aspects of life.

This dynamic is also regarding PTSD suggested by Aupperle, et al. [38]. Thus, the from avoidance cooling off of the NA experience (no correlatively link) is also applied to PA while avoidance in the context of FM neither seem to make you happy or unhappy but instead limited. In parallel, a trade off marked by avoidance [24-26, 39], being perseverative [24-26, 39-40] and using the persevering activity as a means to carry out avoidance [24-26.] consequently taxes physical resources. This dynamic logically concern also the affective resources while stress mediated by sleep disturbance increases NA as referred by Archer et al. [34]. Sleep disturbance has by Mork et al. [41] been associated with a substantially increased risk of developing FM.

Less pain implies higher PA in healthy women but not in women presenting FM. This recording corresponds to earlier finding on self-regulation in FM where flares up of pain are not necessarily feared, counteracted or avoided [24-26]). Another self-regulatory anomaly in FM is that besides a predominance of NA over PA, NA and PA are correlated meaning “floating together”. This divergence concerning e.g. maintaining PA in the face of NA suggests instead a sub optimal development of the self-representation as described by Wentz et al. [24] that also corresponds low level of “self-reference” in FM [39] or to a more reactive and state dependent psychological

functioning as discussed by Zucker [21] with also reference to Van der Kolk [42] concerning DESNOS. The lack of a correlative link between PA and NA is also highlighted by Moran et al. [43].

From the correlative mosaic/matrix concerning FM women, BP is not an essential factor in psychological functioning and invalidity in FM. (With the exception of VT BP is neither associated to the psychological measurements nor to health related quality of life and also not to current workability.) This lack of correlational links render pain in FM appear less psychological in nature than in healthy women where BP relates to PA. This observation was reported also by researchers Malt et al. [44], a surprising finding from an experimental design where much less variance in pain was explained by psychological factors in FM than in healthy controls.

So how could then pain in FM be expressed? From the present result, a pronounced strenuous psychological functioning (including the NA and PA linkage) that contrasts sharply with the functioning of healthy women has been established. This functioning together with from the same study group recorded deviant physiological adaptation to an exercise ergometer test [15, 44-45] in that case also with correlative links to level of BP [44] and pain frequency [45] may hold explanatory power. FM and PTSD implies similarities in terms of avoidance but also fixation of ANS functions. However, in FM high performance, e.g. Wentz et al. [24] or over activity [40] and avoidance through absorption by activity [24-26] both logically challenge and provoke a static ANS. Two compensating, but reciprocally independent, mechanisms thereby collide. One protects the psyche from overstimulation (avoidance) and the other potentially protects the soma from over arousal. Is clinical pain in FM a byproduct to this conflict? Simultaneously, another conflict that undermines the personal resources in FM may subsequently be an effect on the prefrontal cortex and executive functioning from stress hormones [44] as from relentless activities in the name of avoidance. This activity may in turn contribute to executive functioning deficits and stands in the way of lessening reactivity to trauma relevant stimuli [13] thereby maintaining somatic and psychological symptoms. To underline these resource consuming dynamics should we therefore not re conceptualise FM as variant of high performance PTSD where the PTSD like functioning is maintained from e.g. relentless undermining of cognitive (executive) functions? In this context, it appears to be the case that VT (unlike in healthy women) is not related to workability in FM. Furthermore, vitality is also not related to PTSD-like symptoms (as observed in the controls) which might suggest that these symptoms instead play a role of a kind of 'emergency' coping resource at the expense of certain health factors.

Psychological functioning in both FM and PTSD mirror suboptimal resources in dimensions such as attentional control, tolerance of negative emotions, emotion regulation skills, self-definition and ability creating a personal narrative from trauma. Investment in relevant areas of lack of resources that urgently

need to be filled in holds a potential for opening up for a more normalised functioning also of the ANS. An illustrating but still hypothesised process may be constructed from recordings on women experiencing gaps in clinical FM pain; these women namely showing a more "healthy" if not completely healthy HR adaptation to an ergometer test [45]. In parallel, the "gaps in FM pain" -women were found to be older than women with chronic clinical pain and they also exercised less. This latter pattern may mirror personal growth and less of an emergency high performance stance to life.

Limitations

A question of the representability of the sample needs to be asked. Based on the results from Andrell et al. [47] and Palstam et al. [48] the mean age and the gender and health assessed by SF36 on the studied sample is similar to that of women presenting FM in previous studies carried out in the region of Västra Götaland (Sweden) implying that the sample studied is representative for FM women in this region of Sweden.

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References

1. Wolfe F, Smythe H A, Yunus M B, Bennett R M, Bombardier C et al. (1990) The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 33:160-172.
2. Cöster L, Kendall S, Gerdle B, Henriksson C, Henriksson KG et al. (2008) Chronic widespread musculoskeletal pain - a comparison of those who meet criteria for fibromyalgia and those who do not. *Eur J Pain*;12: 600 – 610.
3. Walker EA, Keegan D, Gardner G, Sullivan M, Katon WJ, et al. (1997) Psychosocial factors in fibromyalgia compared with rheumatoid arthritis: II sexual, physical, and emotional abuse and neglect. *Psychosom Med*59:572-577.
4. Häuser W, Hoffmann, E-M, Wolfe F, Worthing A B, Stahl N et al. (2015) Self-reported childhood maltreatment, lifelong traumatic events and mental disorders in fibromyalgia syndrome: a comparison of US and German outpatients. *Clinical and Experimental Rheumatology*, 33(1 0 88): S86–S92.
5. Hellou R, Häuser W, Brenner I, Buskila D, Jacob G, et al. (2017) Self-Reported Childhood Maltreatment and Traumatic Events among Israeli Patients Suffering from Fibromyalgia and Rheumatoid Arthritis. *Pain Res Manag* 2017: 3865249. Published online 2017 Jan 11.
6. Sherman, J J, Turk D C, Okifuji A. (2000) Prevalence and impact of posttraumatic stress disorder-like symptoms on patients with fibromyalgia syndrome. *Clin J Pain* 16:127-134

7. Cohen H, Neumann L, Haiman Y, Matar MA, Press J, Buskila D.(2000) Prevalence of post-traumatic stress disorder in fibromyalgia patients: overlapping syndromes or posttraumatic fibromyalgia syndrome. *Semin Arthritis Rheum* 32: 38-50.
8. Häuser W, Galek A, Erbslöh-Möller B, Köllner V, Kühn-Becker H, et al. (2013) Posttraumatic stress disorder in fibromyalgia syndrome: prevalence, temporal relationship between posttraumatic stress and fibromyalgia symptoms, and impact on clinical outcome. *Arthritis Res Ther* 23: R130.
9. Coppens E, Van Wambeke P, Morlion B, Weltens N, Giau Ly H, et al. (2017) Prevalence and impact of childhood adversities and post-traumatic stress disorder in women with fibromyalgia and chronic widespread pain. *European Journal of Pain*.
10. American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders, (4th ed.). Washington, DC: American Psychiatric Association.
11. Luxenberg T, Spinazzola J, Van der Kolk, B A. (2001) Complex trauma and disorders of extreme stress (DESNOS) diagnosis, part one: Assessment. *Directions in psychiatry*, 21: 373-392.
12. Leskin L P, White P M (2007). Attentional networks reveal executive function deficits in posttraumatic stress disorder. *Neuropsychol* 21: 275.
13. Polak, A R, Witteveen A B, Reitsma, J B Olf M. (2012) The role of executive function in posttraumatic stress disorder: A systematic review. *J affect Dis*, 141: 11-21.
14. Raphael K G, Janal M N, Nayak S. Comorbidity of fibromyalgia and posttraumatic stress disorder symptoms in a community sample of women. (2004) *Pain Med* 5:33-41.
15. Lange E, Mannerkorpi K, Cider A, Archer T, Wentz K. (2017) Physiological adaptation in women presenting fibromyalgia: comparison with healthy controls. *Clin Exp Psychol*, 3, 147.
16. Cohen H, Benjamin J, Geva A B, Matar M A, Kaplan Z. et al. (2000) Autonomic dysregulation in panic disorder and in post-traumatic stress disorder: application of power spectrum analysis of heart rate variability at rest and in response to recollection of trauma or panic attacks. *Psych Res* 96: 1-13.
17. Hasset A L, Radvansk D C, Vaschillo E G, Vaschillo B, Sigal L H et al. (2007) A pilot study of the efficacy of heart rate variability (HRV) biofeedback in patients with fibromyalgia. *Applied Psychophys Biofeedback* 32: 1-10
18. Muraoka M Y, Carlson J G, Chemtob C M. (1998) Twenty-four-hour ambulatory blood pressure and heart rate monitoring in combat-related posttraumatic stress disorder. *J Trauma Stress* 11:473-84.
19. Inal S1, İnal E E, Okyay G U, Öztürk G T, Öneç K et al. (2014) Fibromyalgia and nondipper circadian blood pressure variability. *J Clin Rheumatol*.20:422-6.
20. Pelcovitz D, van der Kolk B, Roth S, Mandel F, Kaplan S, Resick P. (1997) Development of a criteria set and a structured interview for disorders of extreme stress (SIDES). *Journal of Traumatic Stress* 10: 3-16.
21. Zucker, M, Spinazzola J, Blaustein, M, Van der Kolk, B A (2006) Dissociative symptomatology in posttraumatic stress disorder and disorders of extreme stress. *J Trauma Diss* 7: 19-31.
22. Van der Kolk, B. A.,Fisler R. (1995) Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *J traumatic stress* 8: 505-525. *traumatic Stress*,
23. Wentz K A H (2013) Symptoms fluctuation in fibromyalgia. Environmental, psychological and psychobiological influences. DeGruyter, Berlin.
24. Wentz K A H, Lindberg C, Hallberg L R-M. (2004) Psychological functioning in women with fibromyalgia. A grounded theory study. *Health Care Women International* 25:702 –729.
25. Wentz K A H, Lindberg C, Hallberg LR-M. (2012) On parole – the natural history of recovery from fibromyalgia in women: a grounded theory study. *J Pain Manag* 5:177 – 194.
26. Wentz KAH. (2012) Women with fibromyalgia: Distress avoidance interferes with gaps in pain. *J Pain Manag* 5:245– 60.
27. Davis M C, Zautra A J, Reich J W. (2001) Vulnerability to stress among women in chronic pain from fibromyalgia and osteoarthritis. *Ann Behav Med* 23:215-26.
28. Michel P-O, Lundin T, Otto U. (2002) *Psykotraumatologi*. Lund: Studentlitteratur.
29. Weiss D S (2004). The Impact of Event Scale–Revised. In Wilson J.P., & Keane T.M. (red.), *Assessing Psychological Trauma and PTSD* (2ed). New York: Guilford Press.
30. Watson D, LA Clark and A Tellegen (1988a) Development and validation of brief measures of positive and negative affect: the PANAS scales. *J Person Soc. Psychol*54, 1063–1070.
31. Watson D, LA Carey and G Carey (1988b) Positive and negative affectivity and their relation to anxiety and depressive disorders. *J Abnorm Psychol* 97: 346–353
32. Watson D and LA Clark (1994) *The PANAS-X, Manual for the Positive and Negative Affect Schedule — Expanded form*. The University of Iowa reports copyright, 1–24.
33. Norlander T, Bood S Å, Archer T. (2002). Performance during stress: Affective personality, age, and regularity of physical exercise. *Soc behav personal* 30: 495-508.
34. Archer T, Adolfsson B, Karlsson E (2008) Affective personality as cognitive- emotional presymptom profiles regulatory for self-reported health predispositions. *Neurotox Res* 14: 21–44.
35. Sullivan M, Karlsson J, Taft C. SF-36 (1994) *Hälsoenkät. Manual och tolkningsguide*. (Swedish manual and interpretation guide. 2nd edition.) Medicinska fakulteten. Göteborgs Universitet.

-
36. Ware J E Jr, Gandek B. (1998) Overview of the SF-36 Health Survey and the International Quality of Life Assessment (IQOLA) Project. *J Clin Epidemiol* 51:903-12.
 37. Torgén, M. (2005) Experiences of WAI in a random sample of the Swedish working population. In *International Congress Series* 1280. Elsevier.
 38. Aupperle R, Melrose A J, Stein M B, Paulus M P. (2012). Executive Function and PTSD: Disengaging from Trauma. *Neuropharmacol* 62: 686–694.
 39. Lundberg G, Anderberg U M, Gerdle, B. (2009). Personality features in female fibromyalgia syndrome. *J Musculoskel Pain* 17: 117-130.
 40. Van Houdenhove B, Neerinckx E, Onghena P, Lysens R, Vertommen H. (2001). Premorbid “overactive” lifestyle in chronic fatigue syndrome and fibromyalgia: an etiological factor or proof of good citizenship? *J Psychosom Res* 51: 571-576.
 41. Mork P J, Nilsen T I. (2012) Sleep problems and risk of fibromyalgia: longitudinal data on an adult female population in Norway. *Arthritis Rheum* 64:281-284
 42. Van der Kolk B A, Roth S, Pelcovitz D, Sunday S, Spinazzola J. (2005) Disorders of extreme stress: The empirical foundation of a complex adaptation to trauma. *J Traum Stress*: 18: 389-399.
 43. Moran M C, Finez M J, Fernández-Abascal (2017) Sobre la felicidad y su relación con tipos y rasgos de personalidad. *Clínica y Salud*, 28, 5963.
 44. Malt EA, Olafsson S, Lund A, Ursin H (2002) Factors explaining variance in perceived pain in women with fibromyalgia. *BMC Musculoskel Dis* 3: 12.
 45. Wentz K, Archer T. (2017). Pain and physiological adaptation in women presenting fibromyalgia. *J Pain Manag Ther* 1(1).
 46. Wentz K, Archer T (2017) Work Load and Heart Rate in Fibromyalgia: The Hub within “Pain Gaps” and Clinical Pain. *J Chronic Dis Manag* 2: 1011.
 47. Arnsten AF (2009) Stress signalling pathways that impair prefrontal cortex structure and function. *Nat Rev Neurosci*. 10: 410-22.
 48. Andréll P, Schult T, Mannerkorpi K, Nordeman P, Börjesson M, Mannheimer C. (2014). Health-related quality of life in fibromyalgia and refractory angina pectoris: A comparison between two chronic non-malignant pain disorders. *J Rehab Med* 46: 341-347.
 49. Palstam A, Bjersing J L, Mannerkorpi K (2012) Which aspects of health differ between working and nonworking women with fibromyalgia? A cross-sectional study of work status and health. *BMC Public Health* 12: 1076.