$p < 0.002$), and ≥ 60 min ($\beta = 0.144$, $p < 0.002$) was associated with greater global impact of the disease. Similar results were observed for the association of percentage of sedentary time spent in different bout categories with the domains of fibromyalgia impact (function, overall, and symptoms). **Conclusion:** The results seem to indicate that ST accumulated in bouts is negatively associated with the impact of the disease in women with fibromyalgia. Overall, these associations were independent of time spent in MVPA. It might be advisable to promote reducing prolonged ST in this population.

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THU0481 SLEEP DISTURBANCES IN FIBROMYALGIA – AN AUSTRALIAN TERTIARY HOSPITAL EXPERIENCE

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Background: Fibromyalgia (FM) is a central pain disorder with an estimated population prevalence of 2-7% and six times as common in women than men.¹ Obstructive sleep apnoea (OSA) is a structural sleep disorder, with an estimated incidence of 14% of males and 5% females. Incidence of OSA in FM has been variably reported but estimated at 25-81%.² Despite its frequency, the underlying nature of sleep disturbances haven't been consistently replicated. A 2017 meta-analysis found significant differences in sleep efficiency (SE), a measure of total time spent in REM (Rapid Eye movement) sleep, number of arousals and sleep quality.³ Prados et al in 2013 showed women with FM have less severe sleep disturbance than males, suggesting a gender difference.⁴

Objectives: To identify the incidence of FM in a cohort referred to the respiratory department for diagnostic polysomnography (dPSG) at the Gold Coast University Hospital (GCUH), a tertiary referral centre in Australia. We aim to identify epidemiological, gender differences and sleep abnormalities in patients with FM and OSA.

Methods: dPSG reports of 998 patients with 1053 studies at the GCUH from 2015 - 18 was audited. We included FM diagnosed by a rheumatologist from the general Rheumatology clinics of the same facility. Two control groups were formed, one with a random number generator. The second from manual matching of major OSA risk factors such as age, gender and Body mass index (BMI), with a two to one ratio for statistical power. All were subsequently subdivided into gender. Statistical analysis was performed with calculation of mean, standard deviation and T tests for significance as calculated by the computer software Stata.

Results: Abstract THU0481 – Table 1. Demographics Data

	Age (Yrs)	Gender	BMI (kg/m ²)
Control (Random)	51.38 (15.92)	15F/22M	34.51 (10.43)
Control (Matched)	56.25 (9.87)	64F/10M	33.66 (8.71)
FM group	55.83 (10.1)	32F/5M	32.93 (9.14)

Abstract THU0481 – Table 2. Sleep Study Data

A. One to One Random Group				B. Two to One Matched Group			
Mean (Standard Deviation)	FM -	FM +	P value	FM -	FM +	P value	
Epworth Sleep Scale (ESS)	8.57 (5.58)	9.86 (5.27)	0.8898	10.07 (6.43)	9.86 (5.27)	0.4867	
Total Sleep time (min)	325.43 (66.44)	330.59 (83.67)	0.6648	326.61 (85.93)	330.59 (83.67)	0.662	
Sleep Efficiency (%)	78.97 (10.21)	77.58 (11.89)	0.376	75.31 (17.24)	77.58 (11.89)	0.8015	
Sleep Onset Latency (min)	14.96 (15.79)	24.05 (20.86)	0.9723	26.88 (38.80)	24.05 (20.86)	0.315	
Stage NREM (%)	85.81 (6.12)	83.71 (9.47)	0.2629	80.39 (21.90)	83.74 (9.47)	0.3874	
Stage REM (%)	13.98 (6.09)	16.47 (9.60)	0.8893	13.83 (8.00)	16.47 (9.60)	0.9117	
Arousals per hour	29.69 (17.71)	28.03 (21.78)	0.3389	30.19 (28.94)	28.03 (21.78)	0.3407	
Oxygen Desaturation Index (ODI)	23.59 (25.25)	12.26 (18.99)	0.0176	17.45 (24.3)	12.26 (18.99)	0.1522	
Periodic Limb Movement Index (PLM)	5.79 (19.67)	6.73 (12.15)	0.5348	7.40 (16.64)	6.73 (12.15)	0.352	
Total Apnoea Hypopnoea Index (AHI)	29.22 (25.65)	19.79 (20.06)	0.0423	24.32 (25.53)	19.79 (20.06)	0.1984	

C. Matched Male Group				D. Random Male Group			
Mean (Standard Deviation)	FM -	FM +	P value	FM -	FM +	P value	
Epworth Sleep Scale (ESS)	9.2 (6.03)	12 (4.74)	0.8083	7.63 (1.07)	12 (2.12)	0.955	
Total Sleep time (min)	359.45 (32.46)	255.5 (54.72)	0.0002	606.63 (13.98)	255.5 (24.47)	0.0596	
Sleep Efficiency (%)	78.83 (8.20)	65.82 (14.02)	0.0194	77.14 (2.21)	65.82 (6.26)	0.0247	
Sleep Onset Latency (min)	11.55 (7.06)	20.5 (11.36)	0.9598	12.81 (2.94)	20.5 (5.07)	0.8702	
Stage NREM (%)	85.05 (3.83)	89.14 (8.14)	0.2006	86.63 (5.67)	89.14 (8.14)	0.4161	
Stage REM (%)	14.96 (3.84)	10.8 (8.144)	0.0965	13.25 (1.2)	10.8 (1.64)	0.2119	
Arousals per hour	24.15 (9.39)	31.2 (10.19)	0.8975	34.66 (4.42)	31.2 (4.55)	0.3611	
Oxygen Desaturation Index (ODI)	16.28 (22.18)	19.72 (22.77)	0.6084	30.44 (6.38)	19.72 (10.18)	0.2305	
Periodic Limb Movement Index (PLM)	4.98 (9.66)	5.72 (8.62)	0.5563	9.15 (5.35)	5.72 (8.85)	0.3843	
Total Apnoea Hypopnoea Index (AHI)	24.4 (25.27)	37.7 (23.86)	0.8262	37.6 (6.25)	37.7 (10.66)	0.5025	

N.B. Statistically significant data is highlighted in bold

Abstract THU0481 – Table 3. Female Study Data

E. Matched Female Group				F. Random Female Group			
Mean (Standard Deviation)	FM -	FM +	P value	FM -	FM +	P value	
Epworth Sleep Scale (ESS)	10.34 (6.54)	9.53 (5.35)	0.4061	9.93 (1.6)	9.87 (0.96)	0.48	
Total Sleep time (min)	319.9 (90.63)	342.33 (81.81)	0.9015	353 (15.33)	345.15 (14.78)	0.37	
Sleep Efficiency (%)	74.83 (18.22)	79.42 (10.63)	0.9283	81.64 (2.48)	80.05 (1.96)	0.3182	
Sleep Onset Latency (min)	130.39 (93.75)	29.26 (41.14)	0.244	18.1 (4.74)	23.79 (9.91)	0.8042	
Stage NREM (%)	17.12 (9.49)	13.72 (8.49)	0.0841	84.6 (6.73)	82.86 (6.49)	0.5288	
Stage REM (%)	13.72 (8.49)	17.35 (9.62)	0.958	15.06 (1.74)	17.12 (1.67)	0.7735	
Arousals per hour	31.00 (30.85)	27.54 (23.15)	0.2737	22.39 (2.05)	27.22 (4.11)	0.7798	
Oxygen Desaturation Index (ODI)	17.36 (24.73)	11.1 (18.48)	0.1151	13.54 (2.75)	11.32 (3.25)	0.3338	
Periodic Limb Movement Index (PLM)	7.69 (17.49)	6.89 (12.71)	0.3335	0.87 (0.6)	6.18 (2.16)	0.9479	
Total Apnoea Hypopnoea Index (AHI)	23.91 (25.74)	16.99 (18.28)	0.094	16.91 (2.9)	17.07 (3.22)	0.5127	

Conclusion: Female predominance and 3% population incidence of FM was congruent with literature. We note the mean age was nearing expected upper limits for FM. Increased age as a risk factor for OSA may have led this selection bias. Unexpectedly, overall severity of OSA as per AHI and number of desaturating events as per ODI3 was less in FM. We hypothesise that this is due to a higher proportion of females in the FM group compared to males, confirmation would require a larger study cohort, a limitation of this study. It was beyond the scope of this study to explore concomitant medication use and comorbidities and its effect on sleep. Another significant finding was in males, where sleep efficiency (SE) was lower in both matched and random groups. Furthermore, when matched for age, gender and BMI, males FM have reduced total sleep time. Suggesting that males with FM may have additional impediments to good sleep efficiency which may not be readily recognised during clinical evaluation. Similarly to Prados et al, we found females with FM (fig. 3) had a trend for better sleep quality and less sleep disturbance. However, no domain reached statistical significance, which again reflects low study power. This study emphasises the contribution of OSA as a comorbidity for patients with FM and its effect on sleep quality. Importantly, also the differences in gender.

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Back pain, mechanical musculoskeletal problems, local soft tissue disorders

THU0482

HUMAN LUMBAR SPINE FACET JOINT OSTEOARTHRITIS DISPLAYS PREDOMINANT NGF EXPRESSION AND SIGNALING IN CAPSULAR SYNOVIUM AND SUBCHONDRAL BONE MARROW TISSUES INDEPENDENT OF OSTEOARTHRITIS GRADE

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Background: Increased nerve growth factor (NGF) levels are associated with chronic pain conditions, including low back pain and osteoarthritis (OA). NGF signalling through its receptor TrkA regulates pro-inflammatory neurotransmitters such as substance P (SP). Inhibition of NGF has shown therapeutic efficacy in knee OA [1] and chronic back pain [2], but trials have revealed rare cases of rapidly progressive OA of peripheral joints.

Objectives: To describe the tissue distribution of NGF, TrkA, SP and macrophages in facet joint osteoarthritis (FJOA) of the lumbar spine and their association with FJOA grade.

Methods: FJOA specimens were obtained by facetectomy from patients undergoing intervertebral fusion ($n=10$, average age 69 years, 5 males). FJOA severity and presence of synovial hypertrophy was graded using preoperative magnetic resonance imaging (MRI). Relative abundance of NGF, CD68 (macrophages), TrkA and SP in capsular synovium (SY), cartilage (CL), subchondral bone (SB) and subchondral bone marrow (BM) was evaluated semi-quantitatively on a scale ranging from 0-3 using immunohistochemistry. Association between imaging parameters and tissue expression was determined using Pearson correlation analysis.

Results: Synovial hypertrophy as determined by MRI was present in six cases (60%) and median Weishaupt grade of FJOA was 2 (1.5-3) corresponding with moderate to severe OA. NGF was abundantly expressed in SY (3 [0.5-3]) and to a lesser extent in BM tissues (2 [1-3]), whereas TrkA expression was detected in BM exclusively. NGF abundance in SY and BM showed a strong correlation ($r=0.94$), but did not associate with synovial hypertrophy or FJOA severity. CD68+ macrophages were highly abundant in BM (3 [1.5-3]) and sparse in SY tissues (0.5 [0-1]). The relative abundance of macrophages and NGF was strongly correlated in SY tissue only ($r = 0.78$). SP as a downstream mediator of NGF signalling was also abundantly expressed in SY, CL and BM tissues. Tissue distributions of CD68, NGF and SP are summarized in the figure.

Conclusion: NGF expression and signalling is evident in lumbar spine FJOA specimens, but not strongly associated with synovial hypertrophy or disease severity. These results are in agreement with recent studies of human knee OA, which have shown osteochondral NGF expression as a hallmark of symptomatic OA independently of chondropathy or synovitis [3].

Abstract THU0482 – Figure 1.

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THU0483

DEMOGRAPHICS AND CLINICAL CHARACTERISTICS OF A NATIONAL COHORT OF 280 PATIENTS WITH JOINT HYPERMOBILITY SYNDROME, THEIR SOCIOECONOMIC BURDEN AND THE PERFORMANCE OF THE 2017 INTERNATIONAL CLASSIFICATION CRITERIA OF THE EHLERS DANLOS SYNDROMES

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Background: Joint hypermobility syndromes (JHS) encompass a spectrum ranging from asymptomatic joint hypermobility through to Ehlers Danlos syndromes (EDS) including hypermobile EDS (equivalent to the former diagnosis of EDS type 3). Many EDS patients have significant musculoskeletal pain and other systemic comorbidities including autonomic, bowel and bladder dysfunction. We present data from a cohort of patients with JHS referred to our tertiary centre from December 2015 to May 2017.

Objectives: To increase the awareness of the hypermobility syndrome among general rheumatologists and other health professionals. To assess the impact of this condition on the patient general health and their work disability.

To reflect on the 2017 Ehlers Danlos International Criteria

Methods: We undertook a retrospective analysis of medical records. Statistical analysis utilised non parametric Chi squared analysis for between group comparisons

Results: There were 280 patients: 253 patients (90%) were female and 27 were male (10%) with a female to male ratio of 9:1. The age distribution was from 18 to 66 (mean age 42 years). The age at which they were first diagnosed ranged from 4 to 55 (mean age 29 years); 279 (96%) had Ehlers Danlos Syndrome type 3, one patient had Marfan's, one Kyphoscoliotic EDS, and two patients had Tenascin X deficiency. Family history of hypermobility was reported among 185 patients (66%). In relation to the autonomic dysfunction, 185 patients (66%) had orthostatic intolerance, 126 (45%) had gastrointestinal problems; 109 (39%) had bladder dysfunction with 2.5% of them requiring catheterisation. Chronic joint and muscle pain was reported in 91%; 49.6% of these used opioid analgesia long term. One hundred and twenty patients (43%) had work disability.

Patients taking opioids were more likely to have work disability: 54% vs. 34% ($p<0.001$). Bladder problems were more common in the group taking opioids (46% vs 32%; $p<0.02$). A significant association between orthostatic intolerance and bowel problems was observed. Almost half (47%) of those with orthostatic intolerance had bowel problems, compared to only 19% without ($p<0.001$). Patients with bowel problems were more likely to have bladder problems compared to those without bowel problems ($P < 0.001$).

Conclusion: The 2017 EDS International Classification defined thirteen subtypes of EDS. The molecular basis for the hypermobile Ehlers Danlos Syndrome (previously Ehlers Danlos Syndrome type 3) remains to be identified and diagnosis is clinical, preferentially characterised by joint hypermobility, skin hyper extensibility and tissue fragility. However, this study shows that systemic manifestations are frequently observed and they tend to appear in clusters.

As important is the diagnosis of joint hypermobility, the same is the recognition of every aspect of hypermobility syndrome. A tailored multidisciplinary approach can potentially improve the quality of life and lessen the socioeconomic and NHS burden of these patients. In addition we would strongly discourage use of opioids in patients with hypermobility.

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