

Filum Disease behind Fibromyalgia: a preliminary study

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INTRODUCTION

Fibromyalgia (FM) and Filum Disease (FD)/Neuro-Cranio-vertebral Syndrome (NCVS) share several symptoms. Headache, dizziness, paresthesia, muscle weakness, short-term memory loss, difficulty concentrating, sleep disorders, dysesthesia, chronic fatigue, generalized pain, chronic low back pain, mood disorders, and anxiety are some of the symptoms that are common to both pathologies.

The pathological traction effect exerted by the Filum Terminale (FT) on the neuraxis could be the cause of central sensitization behind FM and could explain the pathophysiological changes in the Central Nervous System (CNS) produced by the chronic and progressive traction seen in FD.

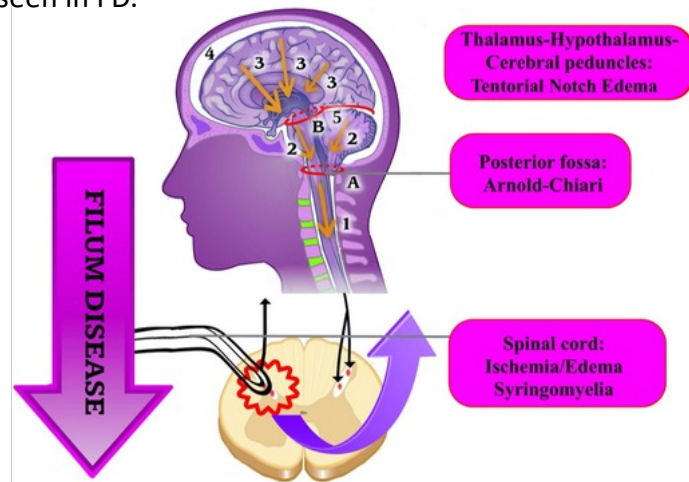


Figure 1. Schematic representation of the effects of FD and the Endoencephalic Impact that follows. 1: Caudal traction of the cervical spinal cord, 2: Caudal traction in the posterior cranial fossa (brainstem and cerebellum), 3: Traction toward the tentorial notch, 4: Enlargement of the supracerebral space, 5: Enlargement of the supracerebellar space, A: Foramen magnum, B: Tentorial notch

METHODS

We conducted a retrospective search of our database between May 18, 2015, and December 2, 2019, and found a total of 394 patients diagnosed with FD/NCVS, as published in a previous article (Royo-Salvador et al., 2020). From this sample of 394 cases, two subsamples were created: the FM/FD sample (25 cases with confirmed diagnosis of FM and FD) and the FD sample (369 cases with FD without confirmed FM). Demographic data, symptoms, signs, and imaging results are presented as the mean $\pm$ standard deviation. Normality of the data distribution was defined using the Kolmogorov-Smirnov test (Shaphiro-Wilk test). Analysis of the postoperative results was performed by comparing the findings with a t-test for paired samples ($p < 0.05$). The correlation of the signs, symptoms, and imaging results between patients in the FM/FD sample and the FD sample was carried out with a linear regression that also considered sex and age.

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Pearson's correlation was also utilized, as well as a t-test for independent samples. Missing data were handled using pairwise deletions.

RESULTS

From a sample of 394 patients diagnosed with FD/NCVS, two subsamples were created. The FM/FD sample consisted of 25 patients with confirmed FM and FD, with a mean age of 38 years, 88% of whom were female and 12% were male. The FD sample included 369 patients diagnosed with FD/NCVS without confirmed FM, with a mean age of 34 years, 72% of whom were female and 28% of which were male. When comparing the prevalence of signs and symptoms in both subsamples, 55% were present in similar proportions in both groups (linear regression, $p < 0.05$), (**Fig.4**).

When assessing the clinical outcomes FM/FD sample one month and one year after the surgery of the Sectioning of the Filum terminale (SFT) (Royo-Salvador et al., 2005), a significant improvement ($p < 0.05$) was seen in most signs and symptoms, as shown in **Fig.2** and **Fig.3**.

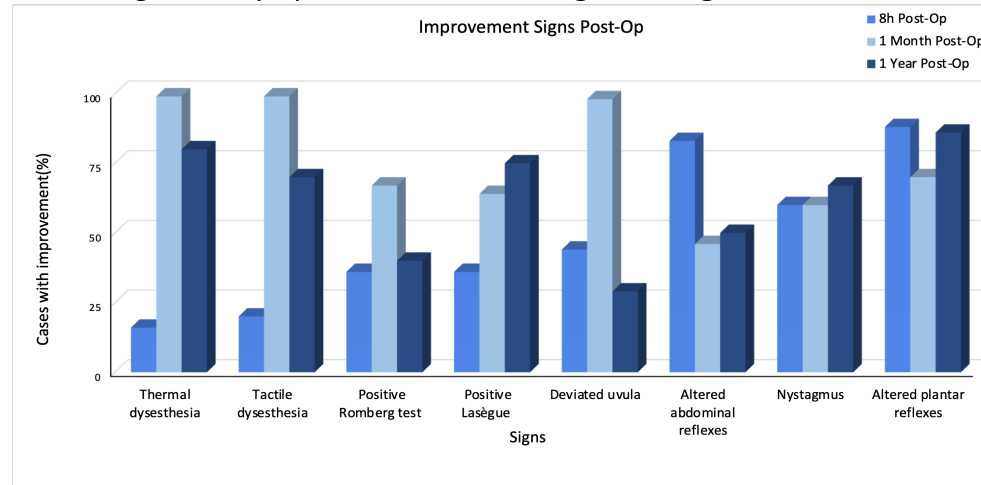


Figure 2. Significant improvements in signs after SFT in the FD/NCVS sample of 25 patients.

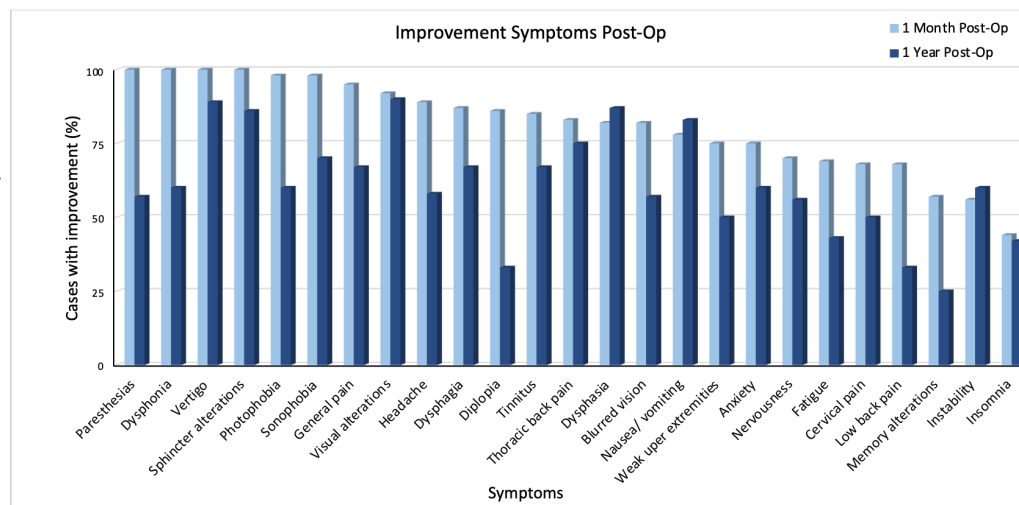


Figure 3. Significant improvements in symptoms after SFT in the FD/NCVS sample of 25 patients.

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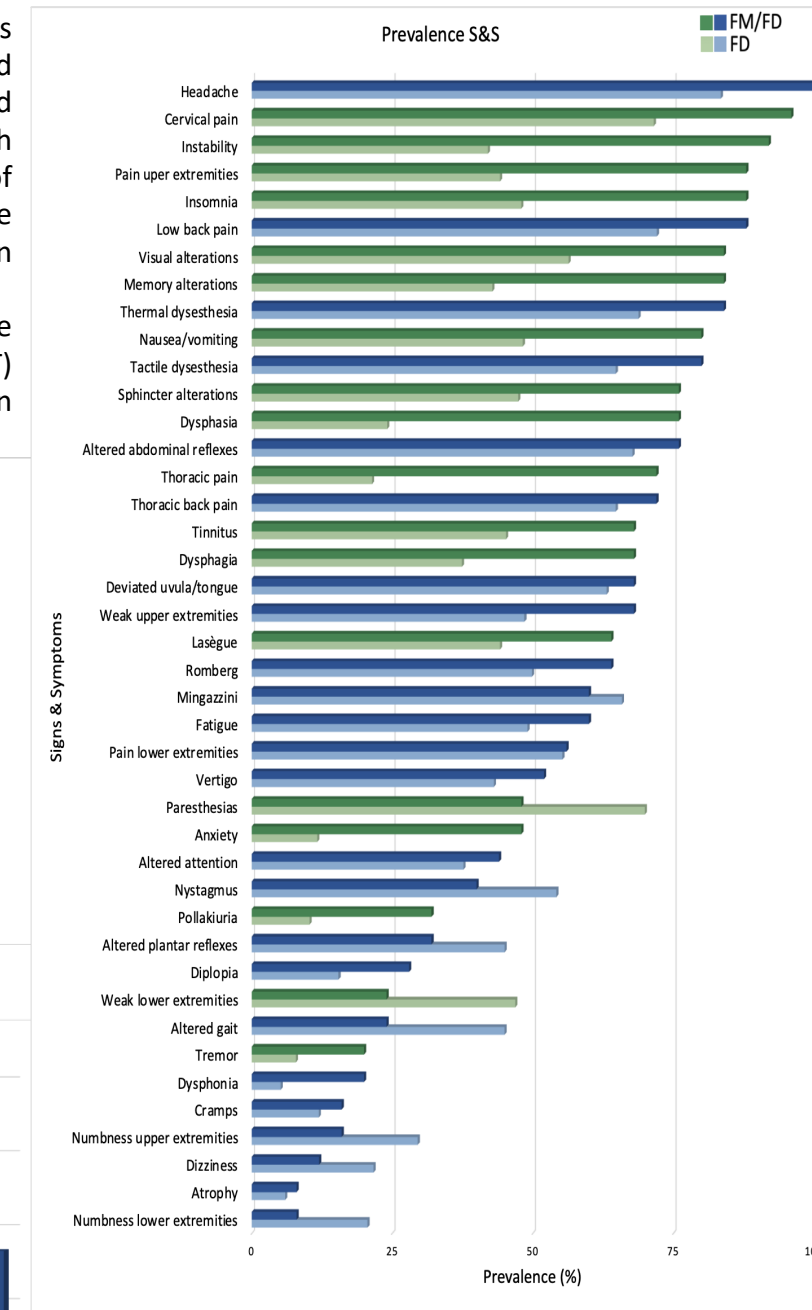


Figure 4. Prevalence of signs and symptoms (S&S) between the FM/FD and the FD samples.

DISCUSSION

What would the etiopathogenic mechanism of central sensitization be, according to the FD theory? The vector force exerted by FD on the CNS (Figure 1) results in a mechanical compromise that alters perfusion and brain metabolism in the narrowest intracranial areas, such as the tentorial notch and foramen magnum. In the tentorial notch, the mesencephalon is compromised, and in the foramen magnum, the brainstem and cerebellum are compromised, which could explain the phenomenon of central sensitization in the brain and the changes observed by various authors. The pathological tractor effect of FD acts on the spinal cord and causes a serious compromise in perfusion, substantially altering the neurophysiology of nociception, which results in the phenomenon of spinal sensitization.

CONCLUSION

The results of the present study show the overlap of a multitude of signs and symptoms between FM and FD, several of which were present in similar proportions between groups. This suggests a strong relationship between FM and FD and that a certain subgroup of FM patients have underlying FD responsible for the development of central sensitization. There are radiological signs that are strongly related to both diseases, namely, descent of the cerebellar tonsils, syringomyelia and multiple discopathy.

SFT results in a notable and significant improvement in the signs and symptoms in a subset of FM patients diagnosed with FD/NCVS. We ruled out that the placebo effect could have something to do with postoperative improvement since the placebo effect would not result in any changes in the clinical signs.

It is very likely that a subgroup of patients diagnosed with FM has FD/NCVS, and that this subset of patients would probably increase when applying the clinical and radiological protocol established in our institution. The SFT via the Filum System Method is a safe and effective minimally invasive procedure with a short duration, low risk, and low complication rate.

We can conclude that FM and FD are, very likely, closely related to each other, share symptoms and clinical and radiological signs with high statistical significance, and that they both present significant clinical improvement after SFT.



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