

# The Relationship between Fibromyalgia Syndrome and Temporo-Mandibular Disorders: The Role of the Dentist

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## Abstract

Fibromyalgia syndrome is characterized by widespread and persistent pain of at least three months' duration affecting both sides of the body, above and below the waist, often located close to the spine or the chest. Fibromyalgia syndrome has many comorbidities including temporomandibular disorders. Dysfunctions of the masticatory system equate to poor performance during functional activities and may lead to adaptive compensatory behaviours. The prevalence of patients that meet FMS and TMD is high. The relationship between TMD and fibromyalgia syndrome is not clear. Orofacial pain may be a first sign of fibromyalgia. Fibromyalgia may be a risk factor for developing temporomandibular disorders. Knowledge of pathophysiology and clinical signs common to both syndromes can clarify the role of therapists whether surgeon dentists and doctors and improve the progression and diagnostic management of these patients. The dentist has a role in the diagnosis and multidisciplinary care of fibromyalgia patients.

**Keywords:** Fibromyalgia; Temporomandibular disorders; Chronic pain syndrome

## Statement of clinical relevance (40 mots)

Orofacial pain may be a first sign of fibromyalgia. Fibromyalgia may be a risk factor for developing temporomandibular disorders. The dentist and doctor can play roles in improving the management of these chronic pain patients in the diagnosis and multidisciplinary care of fibromyalgia patients.

## Introduction

Fibromyalgia is a syndrome that, since 1992, has been listed in the WHO International Classification of Diseases (10<sup>th</sup> revision) and it affects about 2% of the world population. The condition is characterized by widespread and persistent pain of at least three months' duration affecting both sides of the body, above and below the waist, often located close to the spine or the chest. The diagnosis of fibromyalgia may be slow compared with the onset of symptoms and on average; it is diagnosed 4.3 years after symptoms appear [1]. This extended period inevitably leads to medical nomadism whereby patients wander from doctor to doctor, giving patients a bad experience. Establishing a diagnosis is therefore essential to avoid patients being seen as "hypochondriac". There are many conditions that occur concomitantly with FMS, often associated with various syndromes such as chronic fatigue syndrome, irritable bowel syndrome, tension headaches and dysfunction of the masticatory system. In fact, 60 % to 90% of fibromyalgia patients meet the criteria for temporomandibular disorders (TMD) [2,3]. Conversely, the prevalence of patients with TMD and meeting the FMS criteria is lower, approximately 10% to 18% depending on the study [4-8].

The relationship between TMD and fibromyalgia syndrome is not clear. Some authors speculate whether these syndromes are

two different clinical entities, or whether they should be looked on as a single disease [5]. These syndromes belong to a group called "Stress Related Disorders", which are characterized by somatic and psychological complaints [9-11].

Knowledge of pathophysiology and clinical signs common to both syndromes can clarify the role of therapists, whether dental practitioners or physicians. Close collaboration between these therapists will improve the progression and diagnostic management of these patients.

## Fibromyalgia Syndrome

### Epidemiology

A 2009 study reported that 1.4% to 2.2% of the French population suffers from fibromyalgia [12]. There is a female predominance (3 out of 4) with an age of onset between 25 and 55 years (75% of cases). The highest prevalence is between 45 and 54 years; 3.9% of women in this age group are affected [1,12].

### Clinical signs

Among clinical signs, pain is the main complaint. Patients describe widespread diffuse but intense pain that is resistant to non-steroidal anti-inflammatory drugs (NSAIDs) and other treatments, accentuated by cold, fatigue and stress. The pain radiates and is especially felt in the muscles and muscle-tendon junctions of the neck, shoulders, hips and limbs. The pain is constant and axial in distribution, alternately affecting the left and right sides of the body. Sometimes a touch causes pain, which is termed allodynia. Response to an exaggerated painful stimulus is a state of hyperalgesia [13].

This syndrome is associated with various functional symptoms such as sleep disorders, cognitive disorders or signs of depression and anxiety.

The patient may also complain of a feeling of swelling of the extremities with numbness of the hands and feet. Cognitive disorders such as difficulty concentrating, memory loss, digestive and vasomotor disorders such as irritable bowel syndrome or acrocyanosis (poor peripheral circulation) resembling Raynaud's syndrome and pain in the masticatory system complete the picture [13-15].

### Etiologies

Our current state of knowledge does not identify a unique pathoetiology in fibromyalgia syndrome. Current data suggest that fibromyalgia is a psycho-neuro-endocrine disorder involving the central nervous system and an inappropriate response to stress. Indeed, Cabane, in 2011, stated that fibromyalgia has no organic origin; it is not a muscle disease nor is it linked to bone, neurological, systemic, sleep or neurotransmitter dysfunctions [16]. According to the author, a group of brain dysfunctions is implicated in the aetiology of fibromyalgia, but the cause is as yet known.

### Diagnosis

The diagnosis of fibromyalgia is a diagnosis of exclusion. Additional tests, such as laboratory tests and imaging tests, may be prescribed. The results of laboratory tests are generally normal in fibromyalgia patient. Consultations with specialists in cases where neurological, orthopaedic or internal diseases are suspected are recommended. Given the great diagnostic difficulties in fibromyalgia syndrome, many questionnaire methods have been proposed.

The American College of Rheumatology (ACR) was the first to propose a method of diagnosis, in the early 1990s. It defined fibromyalgia as "a diffuse pain syndrome for more than three months touching the left and right side of the body, the upper and lower parts of the body with axial location and perception of pain on palpation of at least 11 points out of 18 points" [15]. These painful points, called "tender points," are located in well-defined zones [15].

The difficulty of conducting this examination in general practice—namely, the choice of a random 11 points out of 18 and not taking into account somatic disorders [17,18], led the ACR to propose another method of diagnosis in 2010 [19]. The ACR criteria are divided into two groups: 1) the extent of pain which is assessed using the Widespread Pain Index (WPI) and 2) an overall assessment of somatic symptoms, fatigue, sleep disorders and cognitive disorders (Symptom Severity, SS). The physician questions the patient about their feeling during the week before the consultation. For the evaluation of painful areas, 19 areas are evaluated. Each area is scored "1" for a painful area or "0" for a non-painful area. The sum of the score is known as the WPI score and ranges from 0 to 19. The severity of fatigue, sleep disorders, cognitive symptoms, and all somatic disorders are rated from zero (no disorder) to three (severe disorder). This becomes an estimate of the severity of symptoms, SS. The diagnosis of fibromyalgia is made when the total score (WPI and SS) is at least 13 of 31 [19-22]. Other questionnaires have been proposed to aid in diagnosis include the Fibromyalgia Survey Questionnaire survey and FiRST: Fibromyalgia Rapid Screen Tool [21,23-27].

### Management

The therapeutic management requires a multidisciplinary approach. In addition to drug treatment, therapeutic measures such as information, medical monitoring, cognitive-behavioural strategies and establishing physical fitness should be implemented [2,28].

### Dysfunction of the masticatory system

Dysfunctions of the masticatory system equate to poor performance of functional activities and may lead to adaptive compensatory behaviours [29-33].

In 2010, the American Association for Dental Research defined temporomandibular disorders (TMDs) as "a group of musculoskeletal and neuromuscular conditions that involve the temporomandibular joints (TMJs), the masticatory muscles and all associated tissues" [34].

### Prevalence

The prevalence of TMDs varies considerably between studies. At least one clinical sign of dysfunction is seen in about 70% of the adult population but the prevalence of temporomandibular disorders (TMD) is about 10% in the adult population with predominance among women. The average age is between 15 and 45 years [30].

### Clinical signs

The clinical picture is usually indicated by the unilateral or bilateral triplex of pain, functional limitation and sounds [29-33]. This triplex can be accompanied by various other clinical signs localized to the cervical region and the ear, such as earache and noise. Headaches can complete the clinical picture.

Muscular TMDs are characterized in most cases by spontaneous myofascial pains sensitive to palpation and exacerbated by use of the muscle. These myospasms result from prolonged hyper-tonicity causing contraction of the muscle, accompanied by painful limitation of mandibular movement. Trauma, infection or mandibular hypomobility can cause a limitation of mandibular movements.

Osteoarticular TMDs often result from abnormal reversible or irreversible positioning of the articular disk. This condition is accompanied by pain and mandibular dyskinesia and may be associated with trismus or mandibular deviations. Clicking and grating sounds are present when the mandible moves. Disk abnormalities may follow these disorders of position. Mucoïd degeneration and perforations may be encountered in these cases, usually accompanied by pain and joint sounds. Osteo-articular TMDs appear when structural abnormalities of the disk cause adhesions due to the healing process. Inflammatory damage may involve various elements of the temporomandibular joint, causing capsulitis, synovitis or arthritis. The temporo-mandibular joint can be affected by degenerative diseases such as osteoarthritis, leading to alterations of the soft tissue. Pain, loss of function and joint sounds accompany all of these conditions.

### Etiology

The etiology of TMD is multifactorial. According to Gola, the TMDs are the result of a combination of general somatic factors, local somatic factors and psychological factors [30].

There are three types of factors:

Predisposing factors create a favorable environment for disease. These factors include anomalies of occlusal function, lax ligaments, other conditions and psychological issues. Trigger factors include trauma, a significant change in the occlusion and emotional shock. The patients cannot adapt to new situation that had been stabilised by structural and functional adaptation. Maintenance factors promote auto-aggravation of the disease. These factors include bruxism, tooth drifting and periodontal migration.

### Diagnosis

The diagnosis of dysfunction of the masticatory system is by thorough clinical examination including history, muscle and TMJ examination and a review of mandibular motility.

An aetiological examination will consist of a search for evidence of occlusal, accidental or other trauma. Additional tests may be required for diagnosis; these tests often include radiological examination, particularly magnetic resonance imaging of the TMJ.

### Management

Dysfunction of the masticatory system is a multi-faceted disease that calls for multidisciplinary management. Currently, the scientific consensus minimises the role of occlusion in the development of this pathology and emphasises its multifactorial aspect. This entails a psychosomatic medical management that focuses on a multidisciplinary approach.

The American Association of Dental Research in 2010 proposed conservative management, reversible and validated by scientific evidence. These reversible strategies reduce the risk of adverse and iatrogenic effects. The technique consists of providing information and patient education about the management of the symptoms [34].

## Fibromyalgic Syndrome and Temporomandibular Disorders (TMD)

### Prevalence

The prevalence of fibromyalgia patients with signs of TMD varies from 67% to 97% depending on the study [4,6,8,35-38]. A 2007 study using the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) demonstrated that of FM patients with facial pain, 71% of patients have TMD [5]. In contrast, the prevalence of patients with TMD that meet the criteria for FMS varies from 10% to 18% depending on the study [4-8]. The prevalence of both disorders is higher in women than in men. The reasons cited are debated and may be hormonal, emotional or behaviour related in women confronted with this condition [11].

### Clinical signs

These syndromes belong to a group called "Stress Related Disorders" and present with disorders related to stress, which are characterized by somatic and psychological issues [9-11]. The relationship between chronic pain and stress or a depression syndrome is currently recognized [39].

Facial pain is amongst the most common clinical sign of TMD encountered in fibromyalgia and is typically localized to the temporomandibular joints, neck and the muscles of mastication. They occur in 32% to 81% of fibromyalgia patients [36]. Of the 80% of fibromyalgia patients who have TMD, 60% suffer from myofascial pain and 20% from pain originating in the TMJ [40].

This pain is accompanied by difficulty opening the mouth and is exacerbated by palpation, jaw movements and mastication [4,5,10,11,36,41,42].

Joint involvement is manifested as joint fatigue, arthritic aches and discal displacement [10,36]. Headaches occur in 75%-93% of fibromyalgia patients [7,9,11,36,42-45].

Fibromyalgia syndrome is characterized by widespread pain and dysfunction of the masticatory system by localized pain [46].

Some authors consider the intensity and duration of generalised pain to be more important than localised pain [36, 47]. For others, the type, intensity and the quality of pain are similar [10]. The intensity of facial pain tends to parallel that of the generalised pain [7,8,48].

The clinical manifestations are more severe in patients with fibromyalgia; there are more tender points, resulting in a functional instability and difficulty working and with a sense of dissatisfaction with overall health [7,8,10,48]. In addition, when there is body pain, it is described as episodic in patients with TMD but persistent in fibromyalgia patients [48].

### Pathophysiology

Few authors, fibromyalgia syndrome should be considered as a risk factor for developing a TMD [11,47,50]. The pathological process leading to the disruption of nociception called "central sensitization" may act as a risk factor for the development of localized transient pain such as facial pain [52,53]. The majority of FM patients reported widespread pain prior to facial pain.

FM had significant effect on TMD facial pain [47]. Thus, facial pain in TMD may be a manifestation or the consequence, a overlap with other pain disorders such as fibromyalgia [4,11,36,39,48,49].

A 2010 study revealed that pain in fibromyalgia patients contributes to the persistence of myofascial pains in the masticatory muscles and increases the intensity of pain in TMD. Patients have a predisposition to develop moderate to severe localized pain, in the 18 months after being diagnosed with fibromyalgia [50]. A patient with FMS may have a decreased tolerance to the aetiologies of TMD. Besson states that traumatic factors or painful conditions such as TMD could represent an irritating thorn that maintains awareness. So, the FM patients often presented painful pathologies [55]. Thus occlusal instability and other functional factors worsen the symptoms without being their triggers [51].

Leblebici differentiates TMD patients with and without pain syndrome of the masticatory muscles [40]. Of TMD patients with this syndrome, 80% suffer from fibromyalgia, while only 18% of TMD patients without this syndrome suffer from fibromyalgia. This syndrome may or may not lead to the high coexistence of fibromyalgia and TMD [40]. Pfaaf, in 2010, proposed dividing TMD patients into two groups [46]. The group with a "pure" TMD unconnected with FMS and a group with a TMD on the borderline with fibromyalgia. This latter group of patients has remote-zone and contralateral tender points, and these patients are considered therefore likely to develop fibromyalgia [46].

In view of these data, it is important to know if the facial pain appeared before or after the fibromyalgia. Facial pain could be a concomitant condition or a trigger for fibromyalgia [11].

Chronic pain syndrome is part of a complex interrelationship between cognitive, emotional, genetic and physiological factors. Important life events and personality traits play a role in the appearance of facial pain, particularly in patients with depressive tendencies.

Furthermore, such patients suffer from chronic fatigue and the diminished self-control could reduce their ability to adapt to pain [39,53,56].

### Management

As a therapist, it seems obvious, confronted with chronic pain patients, to consider these two syndromes.

Da Silva in 2012, stipulate that the evaluation criteria for fibromyalgia should absolutely include palpation of tender points at the head and neck [42].

The use of the rheumatology questionnaire by the dentist has been proposed [47].

Sleep disorders accompanied by fatigue, anxiety disorders or stress are all factors to be considered in the clinical examination [42].

Temporomandibular joint pain may be the first sign of fibromyalgia [5,47]. TMD can exist before the start of fibromyalgia, so that, in the presence of a predisposing environment, it is important to consider TMD as an early warning, especially when the pain is not associated with disturbed occlusal functions or bruxism [51].



Signs and symptoms of “pure” TMD should be differentiated from the signs and symptoms that indicate an extension of a generalized pain syndrome [10,47]. A missed diagnosis of fibromyalgia in a patient with a TMD could lead the patient to lodge formal complaints [47]. It is very important to recognize FM in TMD patients.

The dentist could thus play an important role in the diagnosis of fibromyalgia, reduce the number of patients presenting with generalized pain if care is commenced earlier, and could furthermore optimize the treatment of TMD [11,53,54]. Patients with more expanded pain areas and changes in pain perception over cheek, trapezius and hand dorsum accompanying the TMD are “sensitive” and may develop fibromyalgia syndrome [46]. It would be wise for the dentist, on encountering clinical signs such as fatigue, generalised pain, stress or anxiety- depressive syndrome, to expand the clinical examination to include a review of tender points beyond the orofacial area.

Only 5% remission was observed in TMD patients with fibromyalgia who were treated for problem TMD [47]. Few positive results of myofascial pain of the jaw muscles have been reported during treatment with massage or a bite block in fibromyalgia patients [10,47]. For some authors, the installation of a bite block is useless and even dangerous in fibromyalgia patients [57].

Some authors state that this is not harmful; the bite block can be a help for the dentist who is managing the condition [51]. Protection of tooth surfaces by installing a bite block and bruxism management is important [10]. The management of patients involving a TMD and fibromyalgia requires a multidisciplinary approach [10,46,54,58].

Non-pharmacological treatment with education and self-regulation has had beneficial results for fibromyalgia patients and TMD [4]. A variety of techniques involving physical exercises, stretching sessions and biofeedback as well as prescription of antidepressants have brought success [47].

Treatment of associated symptoms, such as sleep disorder, episodes of anxiety or of depression can be undertaken using cognitive-behavioural treatment and bio-psycho-social interventions [4,9].

The clinician should seek to relieve pain, improve function, and teach the patient to manage effectively the problems and to improve the quality of life. Initial management should be conservative and based on patient education, to reduce harmful behaviour and bruxism.

Treatment and support should be multimodal and multidisciplinary [10].

Patients with fibromyalgia may complain of various oral problems that will interest the dentist [10,37]. Xerostomia is a very common complaint (70.9% in fibromyalgia, 5.7% for the general population) probably due to treatments such as antidepressants, hypnotics and analgesics. Glossodynia is found in one third of patients with fibromyalgia. This type of pain is associated with allodynia and hyperalgesia induced by fibromyalgia. Dysgeusia was reported by 34% of patients and is probably due to medication.

In addition, the management of FMS patients is complicated by pharmacological treatment of fibromyalgia. It is very important to stay informed about the treatment of the patient. Indeed, the most frequently prescribed drug treatments are tricyclic antidepressants, selective serotonin reuptake inhibitors and inhibitors of the reuptake of norepinephrine, muscle relaxants and hypnotics, substances that interact with anaesthetic local adrenaline, some antibiotics and non-steroidal anti-inflammatory drugs [10].

## Conclusion

There are clear relationships between fibromyalgia syndrome and temporomandibular disorders [4,5,9,11,36,40,46,54].

These two syndromes belong to the same complex of conditions. Peripheral events or circumstances lead to central sensitisation and a poor response to stress [9]. A particular psychological profile is identified, that of a woman described as stressed. Depression and anxiety are consequences of both facial pain and fibromyalgia [39].

In the orofacial area, the fibromyalgia patient may complain of severe pain in the region of the masticatory system, the skull and the neck with limitation of movement and muscular fatigue. The physician should be aware of this possibility and should include examination of the masticatory system in the evaluation of fibromyalgia. In addition, early examination allows rapid intervention to reduce orofacial pain, and an amelioration of the prognosis [59]. Orofacial pain can be considered as an alarm signal for the establishment of fibromyalgia syndrome. It is important that the dentist understands the link between these diseases in order to recognize the groups of patients with TMD and who are at risk of developing fibromyalgia syndrome [59].

The dentist managing orofacial pain and fibromyalgia patients must have a comprehensive vision of the patient and participate in a multidisciplinary team effort. More profound studies about the treatment of orofacial pain and fibromyalgia syndrome are still needed [10].

It is essential that a network of specialists likely to face these syndromes; this may include rheumatologists, gynecologists, gastroenterologists, dentists and others. Studies in this direction would be of interest, firstly to clarify the links between the diseases and also to define a framework for effective management [9].

With these scientific data, the roles of the dentist and the doctor are clarified, allowing improved management of these chronic pain patients.

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