

The current referral patterns for temporomandibular joint disorders (TMD) in Greater Manchester

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Background: Temporomandibular joint disorders (TMD) affect up to 50% of the population. Chronic TMD may have a significant impact on patients' quality of life and is associated with a significant cost burden to health services. **Aims:** The aim of this study was to investigate the incidence of TMD in Greater Manchester and to determine the most appropriate setting for its management. **Methods:** Data were retrospectively collected on the demographics, symptoms and management provided to patients referred for TMD. **Results:** There were 789 referrals analysed; 616 to a Tertiary Centre and 173 to a District General Hospital (DGH). The most common reason for referral was pain (82%), followed by limitation in opening (55%) and clicks or sounds (44%). 27% of referrals were managed with a splint and 12% were provided with advice or a patient information leaflet prior to referral. **Discussion:** The effect of chronic pain on patients' quality of life and the cost burden of its management compels us to review current practices in referral and management of TMD. Barriers to provision of treatment in primary care may include a lack of training, remuneration or confidence. These may be overcome with the development of self-care plans for patients and a care pathway for practitioners. **Conclusion:** Based on existing evidence, timely and conservative management of TMD should be encouraged in primary care, enabling better outcomes to be achieved for patients and the maintenance of the experience and skill level of specialist services in secondary care.

Keywords: Temporomandibular Disorders, Pain, Referral Pathway

Background

Temporomandibular joint disorders (TMD) encompass a range of musculoskeletal disorders and are most commonly found to be the cause of non-odontogenic facial pain (Ghurye and McMillan, 2015). They may affect up to 50% of the general population (Ghurye and McMillan, 2015; Dworkin *et al.*, 2011), although it has been suggested that only 5% of people seek treatment (Maixner *et al.*, 2011).

A large study conducted in the US found that first-onset painful TMD had an incidence of 3–4% per year (NICE, 2016). This peaks between ages 25–44 years (Maixner *et al.*, 2011), with lower incidence in younger and older populations (Dworkin, 2011). Females are more likely to be affected (Maixner *et al.*, 2011; Dworkin, 2011) and are additionally more likely than males to seek treatment for TMD (Yule *et al.*, 2016). The epidemiology of TMD amongst the UK population merits further study from a clinical and public health perspective.

Aetiology

It is likely that TMD has a multifactorial aetiology with a combination of biological, psychological and social contributors to symptoms (Durham *et al.*, 2015; Maixner *et al.*, 2011). There has, for some time, been some debate and divergence as to the exact causes (Durham *et al.*, 2015), though the complexity of the pathophysiology is widely agreed upon.

The chronic pain associated with TMD can have a significant impact on a patient's quality of life (Durham *et al.*, 2015; Breckons *et al.*, 2017) and increases use of health services (Durham *et al.*, 2015). Early diagnosis and management in the primary care setting is therefore likely to reduce the long-term impact of TMD by reducing the length of time between presentation and the effective relief of symptoms (Durham *et al.*, 2015). There is currently a lack of clarity on the care pathways that should be followed for patients experiencing facial pain and where they access the relevant health services (Breckons *et al.*, 2017). For patients, delays in diagnosis and management of pain can lead to frustration at a perceived 'failure to progress' as well as an increased negative effect on quality of life (Breckons *et al.*, 2017).

Classification

TMD can be broadly classified into myalgia, arthralgia, intra-articular disorders and headaches attributable to TMD (Durham *et al.*, 2015). They can also be subdivided into acute and chronic conditions; 12% of patients will have just a single episode of pain (Maixner *et al.*, 2011). Chronic TMD is defined as pain or symptoms lasting for at least three months (Maixner *et al.*, 2011; Mujakperuo *et al.*, 2010). TMD symptoms have been found to be persistent in 19% of patients; this was self-reported by patients in a survey which asked whether their TMD pain in the last 3 months had occurred as 'one episode', as 'recurrent bouts' or 'persistently' (Slade *et al.*, 2013).

Diagnosis

The Diagnostic Criteria for TMD (DC/TMD) provides a standardized means of clinical examination of the TMJ and psychosocial screening (Durham *et al.*, 2015; Yule *et al.*, 2016; Maixner *et al.*, 2011). A thorough history and examination is required to identify any systemic conditions or syndromes that may be associated with TMD and exclude any odontogenic causes for the pain (Ghurye and McMillan, 2015). Parafunctional activity may be identified by careful examination of the soft tissues for signs of frictional keratosis, tongue scalloping or non-carious tooth tissue loss (Ghurye and McMillan, 2015). A screening questionnaire may be used to support the diagnosis; there has been reported in the literature a 99% sensitivity and 97% specificity for the correct diagnosis of TMD (Durham *et al.*, 2015; Ghurye and McMillan, 2015).

Patients may present with a range of signs and symptoms including pain in the joint or associated musculature, clicking or other sounds, popping and locking (Durham *et al.*, 2015). Symptoms may be episodic or continuous and vary in severity (Yule *et al.*, 2016). There is a poor association between self-reported severity of pain and the extent of pathology of the joint or muscles (Durham *et al.*, 2015). TMD pain more frequently occurs in patients with other chronic pain conditions such as headache, back pain and irritable bowel syndrome and may present in conjunction with conditions such as fibromyalgia, arthritis or hypermobility (Yule *et al.*, 2016). It is important to take into consideration the existence of psychosocial co-morbidities as they affect patients' pain experience, prognosis and treatment outcomes (Maixner *et al.*, 2011).

There is a reported lack of certainty in the diagnosis of TMD amongst general dental practitioners in primary care and therefore a tendency to readily refer patients to specialist services in secondary care (Durham *et al.*, 2007; Ghurye and McMillan, 2015).

Management

Although there is a need for further high-quality research into the management of TMD (Durham *et al.*, 2015; Yule *et al.*, 2016), there exists an internationally agreed consensus that the initial interventions should be reversible and conservative measures provided in a timely manner (Durham *et al.*, 2015). A multidisciplinary approach has also been advocated (Breckons *et al.*, 2017). Between 75% and 90% of symptomatic patients will experience improvement with conservative management alone (Durham *et al.*, 2015). This has the obvious benefit of reducing the impact on quality of life for the patient but is also less costly than advanced treatment provided in secondary or tertiary care (Durham *et al.*, 2015). Conservative and reversible measures include patient education, self-management, physiotherapy, cognitive behavioural therapy, simple analgesia and the provision of splints in some cases (Durham *et al.*, 2015; Yule *et al.*, 2016). Patients should be informed of the causes of TMD and be provided with the strategies to manage chronic and acute pain, with the understanding that it is a pain condition that ebbs and flows in severity (Ghurye and McMillan, 2015). Self-management may

include reassurance, thermotherapy, massage, and jaw exercises (Yule *et al.*, 2016). A recent systematic review of the literature evaluated the existing evidence on the impact of patient information leaflets (PILs); this review suggested that PILs have a major impact on patients' knowledge, particularly where information was presented graphically (Sustersic *et al.*, 2016). In the context of a common pain condition, PILs were demonstrated to improve patient confidence and belief in the effectiveness of exercises in addition to improving adherence; there was also a reduction in the number of visits to primary care physicians (Sustersic *et al.*, 2016). A PIL should accompany verbal instructions (Ghurye and McMillan, 2015) and should not be provided in isolation (Sustersic *et al.*, 2016). Leaflets have been produced by NHS Choices, The British Association of Oral Surgeons and The Orofacial Pain Project (Maixner *et al.*, 2011). A small randomized controlled trial comparing patient education alone ($n=23$) against splint therapy alone ($n=18$) demonstrated that patients educated on self-management fared better than those treated with splint therapy (Michelotti *et al.*, 2012). Nevertheless, splint therapy, despite having limited evidence to support it (Ghurye and McMillan, 2015; Rajapakse *et al.*, 2017), may offer some patients an improvement of their symptoms (Yule *et al.*, 2016). Stabilization splints and soft splints are most frequently used though there is no evidence to suggest that the more expensive and technique sensitive stabilization splint provides increased benefit when compared with a soft lower splint (Yule *et al.*, 2016). Furthermore, bite splints have been demonstrated to be more effective than either doing nothing or performing jaw exercises (Rajapakse *et al.*, 2017). Surgical interventions are reserved for the small number of cases where there is clear evidence of a degenerative joint disease or intra-articular disc disorder (Durham *et al.*, 2015; Ghurye and McMillan, 2015). Multi-disciplinary management of TMD is encouraged as it may reduce the unnecessary progression to surgical management in some cases (Rajapakse *et al.*, 2017).

A specialist diagnosis of TMD is not always needed, and even taking into consideration general dental practitioners possible knowledge gaps, primary care can be an appropriate setting to diagnose and manage some patients with chronic pain (Breckons *et al.*, 2017). However, referral is recommended for patients who have persistent pain lasting over 3 months, pain that is persistent despite conservative management in primary care, marked psychological distress associated with symptoms or an uncertain diagnosis (Maixner *et al.*, 2011). Those at higher risk of developing chronic TMD symptoms, such as those patients with depression, anxiety or pain-related disability, may benefit from referral to secondary care (Ghurye and McMillan, 2015). Based on clinical judgement, the patient may be referred to oral medicine, oral and maxillofacial surgery, ENT, neurology or a multidisciplinary pain clinic (Maixner *et al.*, 2011). There is evidence to suggest that despite the substantial use of healthcare resources, patients' needs are currently unmet (Breckons *et al.*, 2017), and there is a need for the development of a comprehensive care pathway for management of facial pain, of which TMD is one type, in primary and secondary care (Breckons *et al.*, 2017).

There is a significant cost associated with the management of chronic TMD, with up to 85% of the total financial cost of the condition being spent on those patients who develop chronic symptoms (Fricton, 1995; cited in Ghurye and McMillan, 2015). In addition, patients treated for TMD use significantly more health services than those without the condition (Stowell *et al.*, 2007). Patients who have their pain diagnosed and managed early are least likely to develop chronic symptoms, indicating that a significant cost burden could be alleviated by timely diagnosis and management.

Therefore, this study aimed to describe patterns of referral of TMD to secondary care in Greater Manchester. Two hospital sites were identified; Hospital 1, a tertiary referral centre that accepts referrals to all dental specialties and has a dedicated TMD clinic as well as multi-disciplinary clinics and Hospital 2, a district general hospital that accepts referrals to a maxillofacial and orthodontic department only. By describing referral patterns to these hospitals we hoped to determine the most appropriate setting for the management of TMD. We were unable to collect data on the patients who received management in primary care only and who were not referred into secondary care. In future studies, this would be valuable information that could expand our knowledge on the extent of treatment and the broader experience of TMD in Greater Manchester.

Methods

This study took the form of a retrospective case series. All referrals to OMFS relating to TMD from 1st November 2016 to 3rd August 2018 in Hospital 1 and to 11th November 2018 in Hospital 2 were examined. From Hospital 1, 1500 sequential referrals were examined. Once duplicates were removed 1465 referrals remained, of which, 664 related to TMD. The same process in Hospital 2 yielded 649 non-duplicated referrals, of which 175 related to TMD. Each referral was assessed by a clinician. Further referrals that related to other specialties or re-referrals due to patient non-attendance were excluded. In total, 616 patients were identified in Hospital 1 and 173 patients in Hospital 2 that were suitable for this study.

The information gathered from each case included demographic data, symptoms and management (Tables 1 and 2). The IMD score was obtained by using the patients' postcode. The IMD is an aggregate indicator of deprivation across 7 domains which, when appropriately weighted and combined, summarise the deprivation experienced in that area. It is important to note that IMD is a relative measure and does not quantify 'affluence' or individual experience; it is a place-based measure (Ministry of Housing, Communities and Local Government, 2019). Higher IMD scores indicate greater deprivation. The information was obtained from 'tick box' elements of the referral form as well as 'free text' written by the referring clinician and entered into the data collection proforma. Patients at the two hospitals differed by gender [OR (95% CI) 1.53 (1.01 to 2.30)] and IMD (*p* 0.044), and therefore, the two groups could not be combined.

Hospital 1

Referrals for TMD represented 42.1% of the total referrals to OMFS. The mean age of patients was 40 and most were female (72%). The mean IMD score of 29 placed this group within the 4th quintile for deprivation. The most common reason for referral was pain, with many patients also complaining of clicks/sounds or limitation in opening. Of note, 56% of patients were reported on the referral form to have had no intervention before referral.

Hospital 2

Referrals for TMD represented 26.7% of the total referrals to OMFS. Most patients were female (80%) and the mean age was 42 years. The mean IMD score was 25; also falling within the 4th quintile. Similar to Hospital 1, pain was the most common reason for referral. Most (60%) patients had no intervention before referral.

Table 1. Characteristics of 789 patients referred with TMD

Variable	Total	Hospital 1	Hospital 2	P
	N = 789 %	Tertiary Centre N = 616 %	DGH N = 173 %	
Gender				0.042
Male	26.2	27.9	20.2	
Female	73.8	72.1	79.8	
Age				0.393
0 – 24	17.1	16.1	20.8	
25 – 34	23.1	24.5	17.9	
35 – 44	22.1	22.6	20.2	
45 – 54	17.4	18.2	15.0	
55 – 64	11.5	11.0	13.3	
65 +	8.7	7.6	12.7	
IMD				0.044
1st Quintile	12.5	12.2	13.9	
2nd Quintile	16.1	14.6	21.4	
3rd Quintile	15.3	15.7	13.9	
4th Quintile	19.9	20.8	16.8	
5th Quintile	36.1	36.7	34.1	

Discussion

There is evidence that chronic TMD has a significant impact on patients' quality of life (Philips, 2009). This, along with the cost burden of managing chronic pain conditions, compels us to review current practices in referrals of TMD and its management in both primary and secondary care. Many patients have an improvement in symptoms with minimal intervention and management in primary care (BAOMS, 2014). A study of patients undergoing treatment

Table 2. Symptoms at presentation and management provided before referral

	Hospital 1		Hospital 2 DGH N = 173
	Total N = 789	Tertiary Centre N = 616	
Symptoms at Presentation			
Limitation in opening			
Trismus	11	8	3
Lock	140	98	42
Difficulty eating	118	84	34
Restricted opening	167	130	37
Clicks/sounds	345	261	84
Pain			
Total	646	501	145
>3 months	14	12	2
>6 months	57	43	14
Unspecified	575	446	129
Trauma	35	27	8
Side			
Unilateral	416	327	89
Bilateral	139	113	26
History of disease			
TMD	0	0	0
Rheumatic disease	2	1	1
Other syndromes	7	6	1
Management before Referral			
Advice	97	70	27
Patient Information Leaflet	8	7	1
Splint	216	172	44
Physiotherapy	18	15	3
Previous referral	54	43	11
Prescribed medication	16	15	1
Over-the-counter medication	64	45	19
Surgery	10	10	0

with a non-occluding splint in primary care found that 81% had improved pain at 1 year follow up (Velly *et al.*, 2013). These straightforward and cost-effective options are available to primary care practitioners and we should therefore aim to manage patients in this setting as early as possible after presentation in order to reduce the likelihood of chronic symptoms. It is important to note there are red flag signs and symptoms that would necessitate an urgent referral; these include but are not limited to neurological symptoms, unexplained change to the occlusion, history of malignancy, signs of malignancy such as asymmetry, neck lump, unexplained fever or weight loss (NICE, 2016). Giant cell arteritis, neoplasia, autoimmune disease and cranial nerve abnormalities should be eliminated as causes of pain as the symptoms of these may mimic TMD symptoms (NICE, 2016).

These findings suggest that fewer than 1/3 of patients are provided with a splint and fewer than 1/5 are given information on self-management. Of the patients referred to either hospital, 57% had received no intervention or advice on self-management before referral. In contrast to our findings in Greater Manchester, a US study found that 97.6% of patients were provided with splints, 85.9% were given self-care advice and 84.6% had been advised to take over-the-counter medication (Velly *et al.*, 2013). This may be vastly higher than management provided to the patients in this study because of the method of recording the management of TMD. The referral proforma in use in Manchester does not specify what interventions have been provided before referral. Therefore referring practitioners may be providing these interventions but omitting the information from the free text box on the proforma. It should also be recognized that the method of payment in the US differs from that in England, which may not incentivise the provision of care for TMD (Chestnutt *et al.*, 2009; Holmes *et al.*, 2015).

Currently, 37.3% of referrals to OMFS in Greater Manchester relate to TMD. The proportion of OMFS referrals differed between the two hospitals (Odds Ratio, 2.00 95% CI 1.63-2.45); likely because Hospital 1 is a tertiary care centre with a dedicated TMD clinic, whereas Hospital 2 is a district general hospital. We must consider why GPs do not manage TMD in primary care. This could be a lack of confidence or training in the subject. A qualitative study of practitioners in primary and secondary care found that primary care practitioners expressed fear of misdiagnosis of TMD and subsequently had a low threshold for referral to secondary care. Both primary and secondary care practitioners expressed a negative view of TMD, but not the patients, due to the difficulty in managing the symptoms. This could be attributed to the paucity of good quality evidence on the management of TMD as well as uncertainty surrounding the aetiology (Durham *et al.*, 2007). It may also be attributed to remuneration in primary care services. To increase confidence and training, a care pathway has been designed that would give practitioners guidance on the management of TMD. This has been developed using the Royal College of Surgeons and British Association of Oral and Maxillofacial Surgeons (2014) Commissioning Guide for TMD and National Institute for Health and Care Excellence (NICE, 2016) Clinical Knowledge Summary on its management of TMD. This could decrease the number of referrals and the proportion of patients who experience chronic pain and therefore the financial burden of managing chronic pain.

Additionally, there must be consideration to the specialist and surgical nature of the recipient of the referral. Sixteen oral and maxillofacial surgeons in the UK have sub-specialist training in TMJ disorders and can perform the complex surgical interventions (BAOMS, 2014). This expertise is a fragile and precious resource that should be utilised appropriately. Surgical management of TMD is suitable in few cases and therefore referring to that specialty in the numbers seen in this study should be questioned. The maintenance of skill level of surgeons and the efficient use of the service should be a priority. Specialist care of patients with TMD might

also be commissioned regionally (BAOMS, 2014). Referring patients before management in primary care may also burden the patient with unnecessary hospital appointments and extend the time between presentation and management of the condition.

One role of TMD management is to encourage patients to self-manage symptoms (Ghurye and McMillan, 2015). Consequently, a patient self-care plan has also been created that informs patients how to manage chronic and acute exacerbations of pain, using guidance provided by the Royal College of Surgeons TMD Commissioning Guide and NICE Clinical Knowledge Summary on management of TMD (2016). A written and a verbal plan is preferable to increase patients' knowledge, satisfaction and adherence (Sustersic *et al.*, 2016).

The referral proforma in use in Manchester might also be amended to specify the reason for referral and gain information about treatment already provided. This may help to triage referrals and create an opportunity to advise referring practitioners at an earlier stage to manage patients' symptoms in primary care.

Conclusion

There is a clear need for further research into the aetiology and management of TMD (Durham *et al.*, 2015; Yule *et al.*, 2016). Existing epidemiological data suggest it is a common pain condition, second only to lower back pain in prevalence (Stowell *et al.*, 2007). This study has demonstrated a large number of referrals from primary into secondary care for the management of TMD in Greater Manchester. Despite there being evidence that timely, conservative management produces good outcomes for patients and reduces the experience of chronic pain (Durham *et al.*, 2015), there is limited evidence that management is carried out in primary dental care. We have produced a self-care plan for patients and a management plan for clinicians to address this and to reduce the cost burden of management in secondary care.

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