

Original Article

Chronic Orofacial Pain in Dental Patients: Retrospective Investigation over 12 years

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Orofacial pain is often difficult to diagnose and treat. However, there have been few reports on the clinical observation of dental patients with orofacial pain. We retrospectively investigated the characteristics of 221 dental patients who had suffered from persistent orofacial pain. Data were collected from the outpatient medical records in our clinic over the past 12 years. More than half of the patients (53.8%) had suffered with pain for more than 6 months from pain onset until the first visit to our clinic. The main diagnoses were neuropathic pain (30.3%), myofascial pain (23.5%), psychogenic pain (20.4%), odontogenic toothache (17.2%), and others (7.7%) such as temporomandibular disorders and glossitis. The treatments included pharmacotherapy, splint therapy, and others such as nerve block, dental treatment, physiotherapy, and/or psychotherapy. Excluding the patients (52 of 221 initially enrolled patients) with unknown responses to treatment, 65.7% showed remission or a significant improvement in pain in response to treatment. Although only a small group of patients had odontogenic toothache, the rate of improvement was highest for this disorder. In conclusion, early consultation with a dentist is useful to prevent chronicity of odontogenic pain and to make a differential diagnosis in patients with orofacial pain.

Key words: dental patients, pain clinic, orofacial pain, dental anesthesiology, clinical observation

Some dental patients have persistent pain in the oral and maxillofacial region even after provision of common treatments by a general dental practitioner. Recently, such persistent pain has been called orofacial pain, to distinguish it from common dental diseases with more easily recognized diagnostic criteria.

Orofacial pain is usually accompanied by a complex pathological condition [1], and often includes referred pain from a distant tooth or area [2]. Therefore, the diagnosis of orofacial pain is generally thought to be difficult [1-3]. Because the orofacial region has biological, emotional, and psychological importance, many factors can be involved in orofacial pain [1]. Furthermore, many patients with orofacial pain have a long history of the condition, and such long duration of pain sometimes leads to psychological

disorders [4, 5], which in turn affect the degree and character of the pain [4, 6, 7], making the condition even more complex and persistent. Therefore, it is necessary to diagnose and treat orofacial pain early in order to avoid an increase in complexity and a shift to chronic pain. However, due to the dearth of clinical reports on dental patients with orofacial pain, the clinical information on orofacial pain remains insufficient.

We have diagnosed and treated many patients with orofacial pain at our clinic, the Department of Dental Anesthesiology of Okayama University Hospital. We therefore performed a clinical review of dental patients with orofacial pain who visited our clinic over a period of 12 years.

Materials and Methods

The present study was approved by the Ethics Committee of Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (No. 672).

We retrospectively investigated the characteristics of dental patients who had suffered from orofacial pain. Data were collected from the outpatient medical records in our Clinic of Dental Anesthesiology for the years of January 2001 to December 2012. We extracted the patients' diagnoses, gender, age, location of pain, duration of pain, treatments, and responses to treatments.

The diagnoses were made based on the characteristics of pain, X-ray findings, physiological tests, a drug challenge test, and psychological tests. In some difficult cases, the patients were diagnosed with an interdisciplinary approach. Patients were classified using criteria for orofacial pain modified from the guidelines of the Japanese Society of Orofacial Pain. The responses to the treatments were classified into 4 levels: remission, significant improvement, partial response, and no response, based on the pain-assessment documentation from the medical records.

Results

Patients. Three hundred and twelve patients with orofacial pain visited our outpatient department. Of these patients, 221 with orofacial pain were investigated, and 91 patients with peripheral nerve damage,

dysgeusia, or an unidentified complaint were excluded from the present study. Two hundred and eleven (95.5%) of the patients were introduced to our clinic by general practitioners in local dental clinics or other specialists in our hospital, such as oral surgeons and periodontologists.

Diagnoses. The diagnoses are shown in Table 1. The patients with non-odontogenic pain comprised 81.9% of the total subject group, and included patients with neuropathic pain, myofascial pain, psychogenic pain, and other types of pain such as temporomandibular disorders and glossitis, while the patients with odontogenic toothache comprised 17.2% of the total. Two patients could not be given a definite diagnosis of pain. In the present study, Neuropathic pain was the most in (patients with) non-odontogenic pain.

Gender and age. The patients included 52 males (23.5%) and 169 females (76.5%), aged between 16 and 89 years old, with a mean \pm SD age of 56.6 ± 16.7 years. The prevalence of pain was more than 3 times as high in females compared to males, and every diagnosis was more prevalent in females than males (Fig. 1). This tendency was particularly marked for myofascial pain. The ages were 62.7 ± 15.6 , 50.7 ± 16.9 , 60.7 ± 15.0 , 49.4 ± 16.4 , and 53.9 ± 15.1 years in patients with neuropathic pain, myofascial pain, psychogenic pain, odontogenic toothache, and others, respectively (Fig. 2).

Location of pain. Table 2 shows the locations of pain. They included the jaws, face, tongue, temporomandibular joint, and others locations including the neck, head, lips, mouth floor, and pharynx. Pain occurred in the jaws at the highest rate for every diagnosis (Table 2). Neuropathic and psychogenic pain were also found at a relatively high rate in the face and tongue, respectively. As for the location of pain

Table 1 Classification of orofacial pain

Diagnosis	Number of patients (rate)
Non-odontogenic pain	181 (81.9%)
Neuropathic pain	67 (30.3%)
Myofascial pain	52 (23.5%)
Psychogenic pain	45 (20.4%)
Others	17 (7.7%)
Odontogenic toothache	38 (17.2%)
No diagnosis	2 (0.9%)

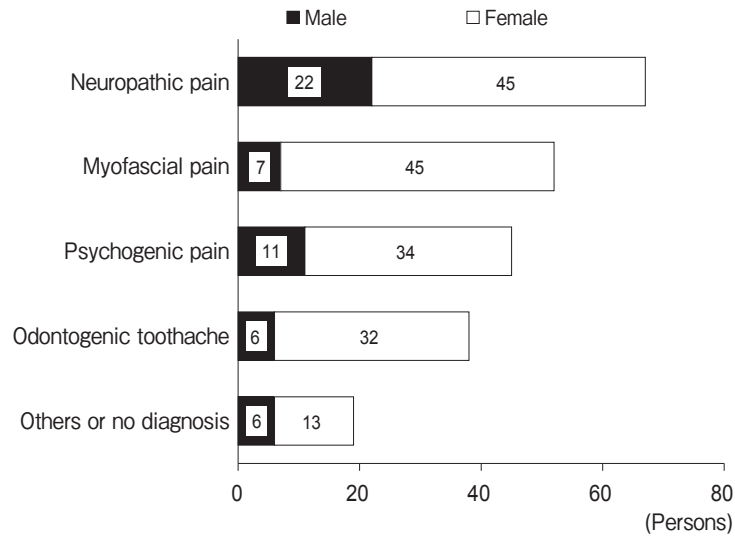


Fig. 1 The number of men and women with each type of orofacial pain.

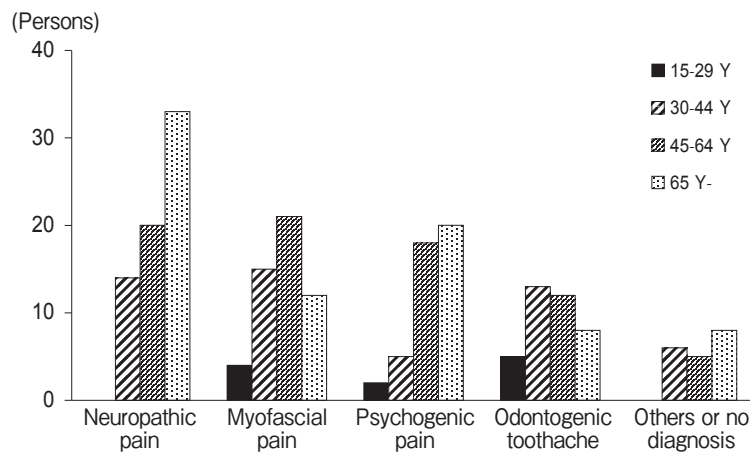


Fig. 2 The age of patients with each type of orofacial pain.

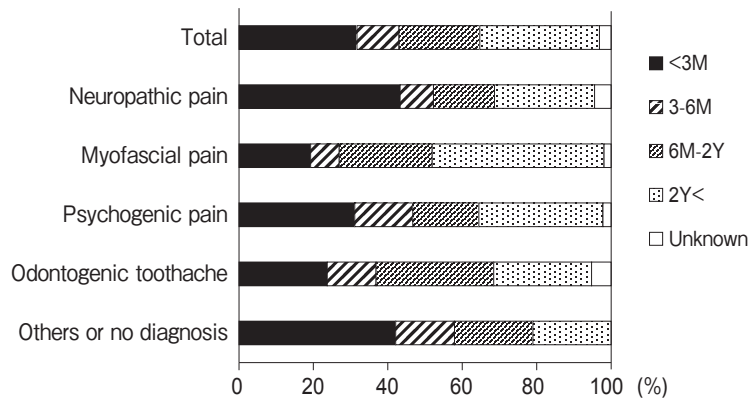
Table 2 Location of orofacial pain (number of patients and rate)

	Total	Neuropathic pain	Myofascial pain	Psychogenic pain	Odontogenic toothache	Others or no diagnosis
Jaws	137 (62.0%)	32 (47.8%)	42 (80.8%)	24 (53.3%)	36 (94.7%)	3 (15.8%)
Face	43 (19.5%)	28 (41.8%)	7 (13.5%)	3 (6.7%)	2 (5.3%)	3 (15.8%)
Tongue	24 (10.9%)	3 (4.5%)	0	17 (37.8%)	0	4 (21.1%)
TMJ	8 (3.6%)	1 (1.5%)	1 (1.9%)	0	0	6 (31.6%)
Others	9 (4.1%)	3 (4.5%)	2 (3.8%)	1 (2.2%)	0	3 (15.8%)

TMJ, Temporomandibular joint.

Table 3 Location of orofacial pain in the jaw region (number of patients and rate)

	Total	Anterior	Posterior	Both
Upper jaw	58 (42.3%)	13 (9.5%)	45 (32.8%)	0
Lower jaw	53 (38.7%)	5 (3.6%)	48 (35.0%)	0
Both jaws	26 (19.0%)	2 (1.5%)	13 (9.5%)	11 (8.0%)

**Fig. 3** The duration of each type of orofacial pain.

in the jaws, the number of patients with pain in the posterior region was greater than that of patients with pain in the anterior region (Table 3).

Duration of pain. The durations of pain from onset until the first visit to our clinic were less than 3 months in 70 patients (31.7%), between 3 and 6 months in 25 patients (11.3%), between 6 months and 2 years in 48 patients (21.7%), and more than 2 years in 71 patients (32.1%). The duration was unknown in 7 patients. In those with neuropathic pain, the duration was less than 3 months, while those with myofascial pain had a duration of more than 2 years (Fig. 3).

Treatments for pain. Treatments for the pain included pharmacotherapy in 151 patients (68.3%), splint therapy in 55 patients (24.9%), and/or other treatments such as nerve block, dental treatment, physiotherapy, and/or psychotherapy such as counseling. The drugs administered for pharmacotherapy are shown in Table 4. Patients who were diagnosed with neuropathic pain were administered drugs such as carbamazepine and pregabalin. Half of the patients with neuropathic pain were diagnosed with trigeminal neuralgia, and were introduced to neurosurgeons after pain relief with medication. Patients with psychogenic pain were mainly administered ethyl loflazepate,

Table 4 Drugs administered for orofacial pain (number of patients)

Classification	Drugs (patients)
Benzodiazepines	Ethyl loflazepate (74) Others (6)
Anticonvulsant agents	Carbamazepine (45) Clonazepam (8) Others (4)
Benzamide	Sulpiride (16)
Muscle relaxants	Tizanidine hydrochloride (18) Others (5)
Tricyclic antidepressant	Amitriptyline hydrochloride (7)
Others	NSAIDs (11) Pregabalin (5) Others (35)

sulpiride, and/or amitriptyline hydrochloride. The patients with myofascial pain were mainly administered drugs such as ethyl loflazepate and/or tizanidine hydrochloride and underwent splint therapy. Medication in conjunction with cognitive behavioral therapy or splint therapy was useful for the patients with a long history of pain. The patients with odontogenic tooth-

ache underwent dental treatment and/or splint therapy as needed.

Responses to treatments. The responses of patients to the treatments were evaluated, excluding the patients (52 patients) whose responses could not be evaluated due to discontinuing visitation. Fig. 4 shows the response rates for the 169 patients. The rate of remission or significant improvement in each diagnosis was 67.3% for neuropathic pain, 59.6% for myofascial pain, 60.5% for psychogenic pain, and 85.2% for odontogenic toothache.

Discussion

There have been few reports on the clinical observation of dental patients with orofacial pain. Thus, the present study shows the clinically significant finding of orofacial pain in dental patients. In the present study, neuropathic pain was the most in patients with non-odontogenic pain. Among the patients with neuropathic pain, 82.1% had trigeminal neuralgia in the present study. In agreement with our results, another investigation has revealed that trigeminal neuralgia showed the highest rate (around 30%) in patients with facial pain [8].

Recent research has shown there are gender differences in pain perception [9–11]. Our study also indicates that orofacial pain is more frequent in females than in males. Lipton *et al.* [9] determined that the prevalence rates among females were consistently higher than those in males for all types of orofacial pain. Regarding chronic pain in other regions, female patients have also been reported to show a

higher prevalence than males [12, 13].

Some reports have described orofacial [11] and chronic [14] pain as being most frequently observed within the age bracket of 45–64 years, and have shown that the prevalence of all chronic pain conditions increased with age [13]. In the present study, the patients with neuropathic or psychogenic pain were older than those with myofascial pain or odontogenic toothache. In agreement with our results, trigeminal neuralgia was reported to occur frequently in the age group between 50 and 70 years [15]. The findings in the present study suggest that neuropathic and psychogenic pain are likely to occur in relatively older people, while myofascial pain and odontogenic toothache tend to occur in middle-aged people.

Our results showed that orofacial pain most frequently occurred in the jaw region. On the other hand, the face was the most frequent location in patients with neuropathic pain (65.1%), and the tongue was the most frequent location in patients with psychogenic pain (70.8%). These findings should assist in the differential diagnosis of orofacial pain.

Orofacial pain often lasts over 6 months and it can lead to chronicity labeled chronic pain [5, 16, 17]. Regarding the duration of pain in the present study, more than half of the investigated patients had suffered for over 6 months before visiting our clinic. On differential diagnosis, chronic pain was found in 71.2%, 57.9%, 51.1%, and 43.2% of patients with myofascial pain, odontogenic toothache, psychogenic pain, and neuropathic pain, respectively. Some reports [3, 18] showed that the duration was variable and may span several years. Another report [19]

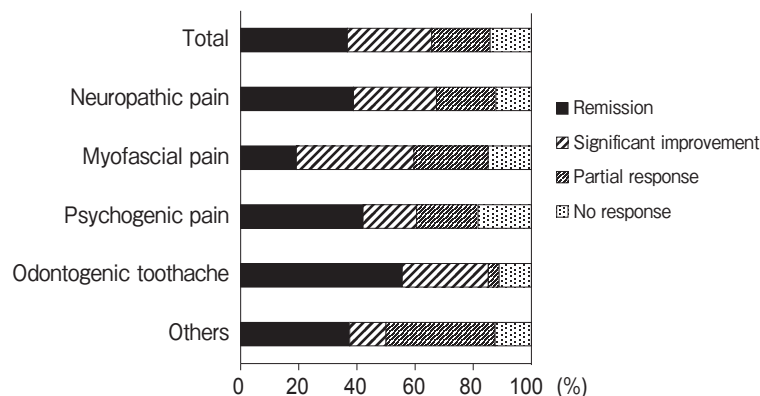


Fig. 4 The treatment responses for each type of orofacial pain.

estimated that the majority of individuals with orofacial pain experience an initial pain episode lasting more than 3 years. The duration of toothache is generally short and less than 6 months [11] or one year [10] due to the easy diagnosis. In our study, the duration of neuropathic pain was the shortest, less than 3 months. In contrast, myofascial pain had a duration of more than 2 years in our study, which was the longest among the types of pain studied. This may have been because myofascial pain was more difficult for the general practitioners or other specialists to differentiate from common dental diseases than neuropathic pain.

Pharmacotherapy is the mainstay of treatment for orofacial pain, and the choice of medication depends on the type of pain diagnosed. Trigeminal neuralgia usually responds to carbamazepine [4, 20], while several recent studies have reported that anticonvulsants (pregabalin) and antidepressants (duloxetine) are helpful for neuropathic orofacial pain [20–23]. However, based on our experience, SNRIs are not particularly effective for orofacial pain. These results suggest that there may be some differences between orofacial and other types of body pain. Amitriptyline hydrochloride, a tricyclic antidepressant, has been reported to be effective for neuropathic [4, 22], myofascial [4], and psychogenic [24] pain. Low dose amitriptyline might be useful for neuropathic and psychogenic orofacial pain even though some patients complain of intraoral discomfort. Benzodiazepines are useful in the treatment of anxiety disorder including panic attacks, although, in our setting, ethyl loflazepate was the most prescribed drug in patients with myofascial and psychogenic pain. Although issues of tolerance and dependence often limit the long-term use of benzodiazepines, we encountered few cases requiring limitation in our series.

In addition to pharmacotherapy, we have used splint therapy to treat patients with myofascial pain, since this treatment is noninvasive and has been reported to be effective [25]. In addition, we have employed psychotherapy for psychogenic pain, which is important for chronic pain [26, 27].

Regarding the effect of our treatments, 111 patients (65.7% of 169 patients) showed remission or significant improvement in response to therapy, excluding the patients (52 patients) with an unknown response to treatment. This means that about two-

thirds of those patients with orofacial pain in whom we could confirm the course after treatment were able to achieve remission or significant improvement. In particular, in odontogenic toothache, the rate of remission or significant improvement was 85.2%, which was the highest rate. Odontogenic toothache can be relieved as soon as the cause of the dental disease is identified. If the patients can be accurately diagnosed by general practitioners or other specialists, they will not have to suffer from pain for a very long time. This result indicates that odontogenic toothache is one of the most important entities to treat easily. General practitioners should thus be attentive to the possibility of odontogenic toothache in patients with orofacial pain.

There were some limitations in the present study. First, the number of patients with each diagnosis was small, so we did not statistically analyze the data for each diagnosis. This was because the overall number of patients with orofacial pain was itself limited, even though the study was conducted at a university hospital. Next, temporomandibular pain caused by temporomandibular disorder has been known to frequently occur as orofacial pain [28]. However, in our hospital, such patients are referred to a special clinic for temporomandibular disorder, and thus patients with temporomandibular pain may have been excluded from our study group. In addition, the assessment of responses to our treatments was performed based on descriptive documentation of pain assessment from medical records. There are several methods to evaluate the measurement of the quality of pain management for improvement, based on some factors, including pain intensity measures, impact of pain on function, patient satisfaction, patient beliefs, documentation of pain assessments, and range and appropriateness of treatment [29]. Recently, the use of a core set of indicators has been recommended—namely, pain intensity, treatment, degree of facilitation of function and quality of life, and adequacy of information about pain management, has been recommended.

In conclusion, we retrospectively investigated the patients with orofacial pain who were seen in our department over a period of 12 years. The majority of patients had suffered from pain lasting for more than 6 months. Despite the small rate of odontogenic toothache (17.2%) in all patients, 85.2% of the patients with odontogenic toothache recovered after dental

treatment. Early consultation with a dentist is useful to prevent the chronicity of odontogenic pain and to make a differential diagnosis in patients with orofacial pain.

References

- Sessle BJ: Why are the diagnosis and management of orofacial pain so challenging? *J Can Dent Assoc* (2009) 75: 275–277.
- Groulet J-P and Palla S: The path to diagnosis; in Bell's orofacial pains, Okeson JP, 5th Ed, Quintessence Publishing Co, Chicago (1995) pp135–143.
- Schnurr RF and Brooke RI: Atypical odontalgia. Update and comment on long-term follow-up. *Oral Surg Oral Med Oral Pathol* (1992) 73: 445–448.
- Ganzberg S: Pain management part II: Pharmacologic management of chronic orofacial pain. *Anesth Prog* (2010) 57: 114–119.
- Ohayon MM and Schatzberg AF: Using chronic pain to predict depressive morbidity in the general population. *Arch Gen Psychiatry* (2003) 60: 39–47.
- Gureje O, Von Korff M, Simon GE and Gater R: Persistent pain and well-being: A world health organization study in primary care. *JAMA* (1998) 280: 147–151.
- Bair MJ, Robinson RL, Katon W and Kroenke K: Depression and pain comorbidity: A literature review. *Arch Intern Med* (2003) 163: 2433–2445.
- Koopman JSHA, Dieleman JP, Huygen FJ, de Mos M, Martin CGM, Sturkenboom MCJM: Incidence of facial pain in the general population. *Pain* (2009) 147: 122–127.
- Lipton JA, Ship JA and Larach-Robinson D: Estimated prevalence and distribution of reported orofacial pain in the united states. *J Am Dent Assoc* (1993) 124: 115–121.
- Riley JL 3rd, Gilbert GH and Heft MW: Orofacial pain symptom prevalence: Selective sex differences in the elderly? *Pain* (1998) 76: 97–104.
- Riley JL 3rd and Gilbert GH: Orofacial pain symptoms: An interaction between age and sex. *Pain* (2001) 90: 245–256.
- Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B and Riley JL 3rd: Sex, gender, and pain: A review of recent clinical and experimental findings. *J Pain* (2009) 10: 447–485.
- Tsang A, Von Korff M, Lee S, Alonso J, Karam E, Angermeyer MC, Borges GLG, Bromet EJ, Demeyteneare K, de Girolamo G, de Graaf R, Gureje O, Lepine JP, Haro JM, Levinson D, Browne MAO, Posada-Villa J, Seedat S and Watanabe M: Common chronic pain conditions in developed and developing countries: Gender and age differences and comorbidity with depression-anxiety disorders. *J Pain* (2008) 9: 883–891.
- Verhaak PF, Kerssens JJ, Dekker J, Sorbi MJ and Bensing JM: Prevalence of chronic benign pain disorder among adults: A review of the literature. *Pain* (1998) 77: 231–239.
- Türp JC and Gobetti JP: Trigeminal neuralgia versus atypical facial pain: a review of the literature and case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* (1996) 81: 424–432.
- Allerbring M and Haegerstam G: Chronic idiopathic orofacial pain. A long-term follow-up study. *Acta Odontol Scand* (2004) 62: 66–69.
- Pilowsky I and Barrow CG: A controlled study of psychotherapy and amitriptyline used individually and in combination in the treatment of chronic intractable, 'psychogenic' pain. *Pain* (1990) 40: 3–19.
- Siqueira JT, Lin HC, Nasri C, Siqueira SR, Teixeira MJ, Heir G and Valle LB: Clinical study of patients with persistent orofacial pain. *Arq Neuropsiquiatr* (2004) 62: 988–996.
- Bassols A, Bosch F, Campillo M, Canellas M and Banos JE: An epidemiological comparison of pain complaints in the general population of catalonia (spain). *Pain* (1999) 83: 9–16.
- Finnerup NB, Sindrup SH and Jensen TS: The evidence for pharmacological treatment of neuropathic pain. *Pain* (2010) 150: 573–581.
- Ney JP, Devine EB, Watanabe JH and Sullivan SD: Comparative efficacy of oral pharmaceuticals for the treatment of chronic peripheral neuropathic pain: Meta-analysis and indirect treatment comparisons. *Pain Med* (2013) 14: 706–719.
- Kroenke K, Krebs EE and Bair MJ: Pharmacotherapy of chronic pain: A synthesis of recommendations from systematic reviews. *Gen Hosp Psychiatry* (2009) 31: 206–219.
- Nightingale S: The neuropathic pain market. *Nat Rev Drug Discov* (2012) 11: 101–102.
- Hunter S: The management of "psychogenic" orofacial pain. *BMJ* (1992) 304: 329–330.
- Bush FM: Occlusal therapy in the management of chronic orofacial pain. *Anesth Prog* (1984) 31: 10–16.
- Aggarwal VR, Tickle M, Javidi H and Peters S: Reviewing the evidence: Can cognitive behavioral therapy improve outcomes for patients with chronic orofacial pain? *J Orofac Pain* (2010) 24: 163–171.
- Keefe FJ and Beckham JC: Behavioral assessment of chronic orofacial pain. *Anesth Prog* (1990) 37: 76–81.
- Durham J: Oral Surgery: part 3. Temporomandibular disorders. *Br Dent J* (2013) 215: 331–337.
- Gordon DB, Pellino TA, Miaskowski C, McNeill JA, Paice JA, Laferriere D and Bookbinder M: A 10-year review of quality improvement monitoring in pain management: recommendations for standardized outcome measures. *Pain Manag Nurs* (2002) 3: 116–130.