

Profile of Craniomandibular Disorders subjects with concomitant occipital neuralgia regarding previous consultations and use of medication.

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Abstract:

Introduction: Occipital neuralgia is a very complex neurophysiological disorder refractory to conventional treatment. **Goals:** Assess previous use of different medications by ON subjects including pain killers, muscle relaxants, benzodiazepines and antidepressants. Evaluate previous clinical consultations with different health professionals, compare ON and TTH subjects regarding frequency of consultations with ENT specialists. **Methods:** A retrospective review of medical records of 80 subjects presenting with craniomandibular disorders and occipital neuralgia and 100 subjects demonstrating craniomandibular disorders and signs and symptoms of tension-type headache. Clinical examination, assessment of the chief complaint a short form to evaluate both occipital neuralgia and tension-type headache, questionnaires, palpation of the temporomandibular joints and masticatory muscles, evaluation of bruxing behavior, and a questionnaire for medication and previous consultations with health professionals were used to gather data. Clinical criteria for both occipital neuralgia and tension-type headache was used. Use of different medications and previous consultations with health professionals was compared in those with occipital neuralgia and tension-type headache. Data were analyzed using Fisher's exact test and Mann-Whitney nonparametric statistics. **Outcome:** Craniomandibular and occipital neuralgia subjects were older (mean 39,9; standard deviation 10,2; range 15-75) than tension-type headache ones (mean=30,0, SD= 11,3; range= 14-60 years). Mann-Whitney non parametric statistics ($p<0,0001$). Craniomandibular and occipital neuralgia subjects used larger amounts of pain drugs (mean=3,4, SD=1,7, range=0-6) as compared to tension-type headache ones (mean=1,9, SD=1,5, range 0-7). Mann-Whitney statistics ($p<0,0001$). More subjects in the Craniomandibular and occipital neuralgia subgroup (76/80) used analgesics as compared to those in the tension-type headache subgroup (80/100): Fisher's exact test ($p<0,004$). The frequency in the use of muscle relaxants was higher in the Craniomandibular Disorders and occipital neuralgia subgroup (mean=1,24; SD=1,00; range=0-4) as compared to the tension-type headache subgroup (mean=1,0; SD=1,2; range=0-5). Mann-Whitney statistics ($p<0,03$). More subjects in the Craniomandibular Disorders and occipital neuralgia subgroup (59/80=74%) used muscle relaxants as compared to the tension-type headache subgroup (54/100=54%): Fisher's exact test ($p<0,008$). There was no statistical difference neither in the frequency of previous use of benzodiazepines (Craniomandibular Disorders and Occipital Neuralgia subgroup: Mean=0,27, SD=0,57, range=0-3; Craniomandibular Disorders and Tension-Type Headache group: Mean=0,25, SD=0,61, range=0-3. Mann-Whitney statistics $p=0,66$) nor in the number of subjects that previously used such drugs: Occipital neuralgia group 18/80=22,5% and Tension-Type Headache group 18/100=18% (Fisher's exact test $p=0,46$). Craniomandibular disorders and Occipital Neuralgia subjects used larger amounts of antidepressants (mean=0,63, SD=0,80, range=0-3) when compared to Craniomandibular Disorders and Tension-type headache subjects (mean=0,33, SD=0,70, range=0-4): Mann-Whitney statistics ($p<0,01$). Further, more subjects in the Occipital Neuralgia subgroup (37/80=46%) used antidepressants as compared to the tension-type headache group (25/100=25%) and the difference was statistically very significant (Fisher's exact test $p<0,004$). Craniomandibular Disorders and Occipital Neuralgia subjects were evaluated by a larger number of health professionals (Mean=3,3; SD=2,4; range=0-16) as compared to Tension-type headache subjects (Mean=2,0;

SD=1,7; range=0-12): Mann-Whitney statistics $p<0,0001$). More subjects in the Craniomandibular Disorders and Occipital Neuralgia subgroup (28/80=35%) than in the Craniomandibular Disorders and Tension-Type Headache subgroup (9/100=9%) were assessed by an ENT specialist: Fisher's exact test ($p<0,0001$).

Conclusion: *The subgroup presenting with Craniomandibular Disorders and Occipital Neuralgia used larger amounts of analgesics, muscle relaxants, antidepressants and consulted a greater number of health professionals including ENT specialists as compared to the subgroup with Tension-Type Headache.*

Keywords: *Craniomandibular Disorders. Occipital Neuralgia. Tension-Type Headache. Medication. Previous consultations.*

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I. Introduction

Occipital neuralgia (ON) is a refractory and disabling disorder characterized by recurrent headaches of moderate to severe intensity felt in the occipital region with frequent radiation to the neck and to some craniofacial structures^[1]. This headache disorder is characterized by unilateral or bilateral pain described as paroxysmal, shooting, stabbing reported in the posterior part of the scalp, in the distribution of the greater, lesser and/or third occipital nerves^[2]. Pain in ON is also described as a distinct type of headache characterized by piercing, throbbing, or electric-shock-like pain reported in the upper region of the neck, back of the head and behind the ears, scalp, forehead and behind the eyes^[3]. ON pain may also be described as unilateral or bilateral and may be reproduced by gentle palpation in the distribution area of the greater occipital nerve (GON)^[4]. Pain in ON is usually accompanied by diminished sensation or disaesthesia in the affect anatomic area^[5]. Many previous modes of therapy usually cause frustration to both patient and practitioner^[1]. The diagnosis of ON is complicated by the fact that other pain disorders including migraine, cervicogenic headache and post-traumatic pain may also be present^[6] posing serious difficulties to discern about the true origin of pain. Many ON patients have been treated under multiple diagnoses or misdiagnoses including migraine, tension-type headache, atypical facial pain, odontalgia, periorbital pain and temporomandibular disorders^[7].

Because initial modes of therapy may not be satisfactory many modes of therapy have been recommended to alleviate pain and associated discomfort^[3]. Treatment failures may lead to anxiety, frustration, diminished productivity and dependence on many drugs for pain^[1]. For a subgroup of patients some treatment modalities have little or temporary efficacy^[8] causing additional anxiety and frustration in such patients. Failure in diagnosing and managing ON properly may lead to persistence of signs and symptoms which may last for months^[5] or even years. Patients usually report a number of consultations with other experts in headache management^[9]. The fact that ON is refractory to conventional modes of therapy may also contribute to pain of longer duration and greater intensity^[10]. Treatment modalities in ON are classified as conservative and non-conservative. When the cause of ON is structural, then a non-conservative surgical approach is preferred^[11]. It is believed that because in many cases pain in ON is not properly diagnosed, it is treated as a case of migraine and previous modalities of treatment are considered not satisfactory. Thus, patients are encouraged to look for other specialist to treat ON using invasive modes of therapy. Pain in ON is a challenging clinical condition for which there is no a standardized mode of therapy^[6]. Because there is a paucity of clinical studies about diagnosis and management of ON, this study is designed to test the following hypothesis

- 1.ON is also characterized by previous used of larger amounts of different medications
- 2.Because ON is a very intense pain, ON subjects are more likely to more frequently use muscle relaxants to alleviate pain and tension in the cervical region;
3. Because CMDs and ON subjects usually report very intense and more chronic pain they are more likely to report previous or current use of antidepressants as compared with CMDs and TTH subjects;
4. Because ON pain is a diagnostic and therapeutic challenge, ON subjectst are more likely to report a history of multiple consultatios with different health professionals.

II. Material and Methods

Sample

Clinical records from patients referred consecutively to the Orofacial Pain Department School of Dentistry UNIRG University are usually stored in a database fso as to be used in future studies of variables of interest. Since the year 2000, all patients have been examined by the same specialist in the field (OFM) having in mind some pré-requisites to store such data for future studies: 1) Patients should be examiend comprehensively by a specialist in the Field of Craniomandibular Disorders (CMDs) and Orofacial Pain, 2) Examination should follow diagnostic criteria widely accepted in the Field of Orofacial Pain and CMDs, 3) Only those cases with complete information are usually stored in the database for future retrieval and evaluation 4) Accepted psychological tests, for instance TMAS, BDI, HO etc, are used to gather psychological

information, 5) Examination in every referred patient follows the same protocol and subjects sign a formal consent allowing researcher to use his/her material for research purposes in which anonymity is guaranteed. Following these guidelines and in order to carry out the current study we retrieved the first 80 clinical records of cases presenting information about CMDs and ON (Experimental group n=80) and the first 100 clinical records from subjects with CMDs and tension-type headache (TTH), n=100=control group.

Inclusion criteria for ON: A complaint of unilateral or bilateral headache pain described as shooting, stabbing, sudden, burning and electric shock, pain described in the upper neck region radiating anteriorly to the temporal, frontal and ocular regions, pain described as severe most of the time, presence of a pain generator region between the nuchal line and mastoid process, numbness in the upper and posterior head region, severe tenderness in the “pain generating zone”, presence of auditory symptoms including dizziness and severe pain when palpating the pain generating zone.

Inclusion criteria for CMDs: A complaint of pain in one or more anatomic components of the masticatory system (usually muscles and/or joints), difficulties to perform normal jaw movements, joint noises, tenderness to palpation of the masticatory muscles and temporomandibular joints (TMJs), and headache of musculoskeletal origin.

Inclusion criteria for TTH: Pain described as bilateral in the anterior temporal frontal and cervical regions, pain described as dull, constant, pressing, constricting, usually mild, moderate and occasionally severe, presence of nausea much more frequently than vomiting, tenderness to palpation in the anatomic areas reported as painful^[12].

Exclusion criteria: Individual presenting with severe psychological and/or psychiatric disorders, those presenting with some form of epilepsy including Parkinson disease and/or other movement disorder and those with speech difficulties and cognitive disorders were clinically evaluated but their charts were neither stored in the database nor included in the current investigation.

III. Statistical analysis

Fisher's exact test and Mann-Whitney statistics were used to analyze data in the current investigation. Significance was accepted when $p < 0,05$.

IV. Outcome

This investigation evaluated an experimental subgroup of 80 CMDs subjects presenting with concomitant signs and symptoms of ON and a control one (n=100) with CMDs and concomitant signs and symptoms of TTH. Mean age in the CMDs and ON group was about 39,9 (SD=10,2, range=15-75) and 30,0 (SD=11,3, range=14-60) in the CMDs and TTH subgroup. Subjects in the CMDs and ON group were usually older than those in the CMDs and TTH subgroup (Mann-Whitney statistics $p < 0,0001$), an extremely significant difference. Females predominated in both groups and gender differences were not observed (Fisher's exact test $p = 0,30$). See Table I for further observations.

Subjects in the CMD + ON subgroup reported the use of larger amounts of **pain killers** (mean=3,4; SD=1,7, range=0-6) as compared with the CMDs + TTH subgroup (mean=1,9; SD= 1,5; range=0-7) and the difference was extremely significant (Mann-Whitney statistics $p < 0,0001$). More subjects (76/80) in the CMDs + ON subgroup used **pain killers** to alleviate pain as compared with the CMDs + TTH subgroup (80/100) and the difference was statistically very significant (Fisher's exact test $p < 0,004$). Subjects in the CMDs + ON group used larger amounts of muscle relaxants (mean=1,24; SD=1,00; range=0-4) as compared to subjects in the control CMDs + TTH group (mean=1,0; SD=1,2, range=0-5) and the difference was statistically significant (Mann-Whitney statistics $p < 0,03$). More subjects (59/80=74%) in the CMDs + ON group used muscle relaxants as compared to those in the CMDs + TTH group (54/100=54%) and the difference was very significant (Fisher's exact test $p < 0,008$). The use of benzodiazepines in both groups is described as follows: CMDs + ON subgroup (mean=0,27, SD=0,57, range=0--3) and CMDs + TTH group (mean=0,25, SD=0,61, range=0--3). This small difference was not statistically significant (Mann-Whitney statistics $p = 0,66$). An equivalent number of subjects in the CMDs + ON subgroup (18/80=22,5%) and in the CMDs + TTH (18/100=18%), made use of muscle relaxants drugs and the difference was not statistically significant (Fisher's exact test $p = 0,46$). Regarding antidepressant use, subjects in the CMDs + ON group used larger amounts of antidepressants (mean=0,63, SD=0,80, range=0—3) when compared to the CMDs + TTH subgroup (mean=0,33, SD= 0,70, range=0-4) and the difference was statistically significant (Mann-Whitney statistics, $p < 0,01$). More subjects in CMDs + ON group used antidepressants (37/80=46%) as compared with the CMDs + TTH subgroup (25/100=25%) and the difference was statistically very significant (Fisher's exact test $p < 0,004$). See Table 2 for further details.

CMDs and ON subjects were examined by a greater number of different health professionals (mean=3,3, SD=2-4, range= 0-16) as compared with subjects in the CMDs + TTH group (mean=2,0, SD= 1,7, range=0-12) and the difference was statistically extremely significant (Mann-Whitney-statistics $p < 0,0001$). Further, 28/80=35% subjects in the CMDs + ON subgroup as compared with 9/100=9% in the CMDs + TTH

group were assessed by an ENT specialists and the difference was statistically extremely significant (Fisher's exact test $p < 0,0001$). See Table 3, for additional details.

V. Discussion

CMDs and ON subjects more frequently used pain medication as compared

with TTH subjects. It may be that a combination of severer pain, unsatisfactory results with most types of analgesics, central excitatory effects, pain sensitization, a tendency to use conventional pain killers in the treatment of headache and the fact that neuropathic disorders do not respond well to the use of conventional (NSAIDS) and non conventional pain killers may have encouraged patients or doctors to shift frequently to other medications for severe unilateral or bilateral pain. Supporting these points of view, one investigation[9] reported that analgesics, anticonvulsants and antidepressants are usually selected as an appropriate combination of medication in the management of ON. Complex pain killers are usually recommended in the management of ON as the diagnosis of this condition is very difficult[13]. It is not rare to diagnose ON under the impression of trigeminal neuralgia which encourages clinicians to prescribe NSAIDS, carbamazepine, gabapentine and even tramadol[14]. In many cases ON may have a multifactorial etiology, a complex diagnosis and a difficult treatment involving pharmacological and non-pharmacological invasive and non-invasive approaches[15]. In many cases, the patient may not be satisfied with the efficacy of a given pain killer and then he or she may feel encouraged to take other analgesic drug[3].

CMDs and ON subjects more frequently used muscle relaxants as compared to TTH subjects.

ON usually occurs together with other neck disorders including cervicogenic headache, poor head posture, myofascial pain and neck and shoulder tension. These disorders encourage doctors to prescribe muscle relaxants more frequently. Even though such muscle tension can also be observed in subjects with TTH, such pain is not so severe/incapacitating as it is in the case of ON. This point of view shared by one study[16] reporting that several disorders share certain features with ON, such as pain in the posterior neck and head. Neck pain, headache and CMDs usually co-occur with muscle tension being wise to prescribe muscle relaxants in patients presenting with ON signs and symptoms. There are many drugs that can be prescribed in the stage of conservative management of ON including antidepressants, anticonvulsants such as gabapentin and muscle relaxants such as baclofen[17] and cyclobenzaprine clorhydrate. A muscle relaxant may also be used as such drug demonstrates an inhibitory effect of the motor endplate[18] and reinforces the effects of proper postural correction in patients with ON. The more frequent use of muscle relaxants in ON subjects as compared to TTH ones may also be explained by the fact that in the current investigation, ON subjects consulted much more pain clinicians as compared to those presenting signs and symptoms of TTH. Additionally, a higher frequency of treatment failures in ON subjects[1] may encourage patients to search and take other medications to reduce pain, anxiety and muscle tension. Initial treatment options in the treatment of ON signs and symptoms focus on conservative measures including the use of muscle relaxants to reduce secondary muscle tension[19]

CMDs and ON subjects more frequently used antidepressants as compared with TTH subjects.

A combination of very severe pain, longer duration and feelings of hopelessness and helplessness, are some ON characteristics that are not observed frequently in TTH cases. These characteristics may in many cases cause or contribute to anxiety and depression, thus, leading clinicians to prescribe antidepressants to most patients presenting with signs and symptoms of ON. Supporting these points of view one investigation[3] contends that anti-inflammatory medications and tricyclic antidepressants constitute the most common methods of preventive medication in ON cases. Because of such clinical and psychological characteristics of ON patients, antidepressants, non-steroidal analgesics and opioids[18] constitute the most common conservative approaches to ON. Amitriptyline 25mg, muscle relaxants such as baclofen and anticonvulsants such as gabapentin or carbamazepine are the most common medications prescribed to alleviate pain, depression and anxiety in ON patients[17]. In the present investigation ON patients used a number of different drugs including antidepressants, analgesics and muscle relaxants to get rid of pain, muscle tension, anxiety and depression. This outcome is consistent with a previous investigation reporting that "all ON patients in such study had attempted other treatment modalities including a number of drugs, steroids injections, botox and acupuncture[1]". TTH is usually described as mild or moderate whereas ON pain is more frequently described as a "severe and persistent disorder" and is also more likely to induce more painful anatomic areas as a result of sensitization of the trigeminal nerve. Thus, ON pain rather than TTH is more likely to facilitate the development of depression. If so, a combination of muscle relaxants, antidepressants and anti-anxiety drugs are more likely to diminish pain, depression and anxiety than other combination of drugs[10].

CMDs and ON subjects more frequently consulted different health professionals as compared with TTH individuals.

There are many reasons for ON patients to seek medical assistance with a diversity of health professionals. These reasons include severe, referred and long lasting pain, diagnostic difficulties, symptoms that apparently improve but return more persistently with time, side effects of a number of drugs used to treat severe pain, symptoms that are mediated by different nerves and the fact that the source of pain may be located in a different anatomic zone. Based on patients' reports and use of questionnaires, most frequent specialists consulted by patients included neurologists, ENT specialist, pain specialist, psychologist and psychiatrics, general practitioner, orofacial pain specialist and dental surgeons. Consistent with these observations, one investigation[13] reports a clinical case in which the patient consulted with a neurologist, rheumatologist, emergency and ENT specialist. Further support for the outcome in the current study comes from another clinical study reporting that pain specialists, physical therapy, neurosurgery[16], acupuncture, electrical stimulation, local anesthesia[1], indicating that ON patients have a history of many different treatments and consultations with many specialists. Neurosurgical and local anesthesia approaches strongly suggest that ON is a neuropathic disorder with necessarily involves the participation of many health professionals in the diagnostic treatment process. Doddamani and colleagues[2] go further to indicate that in cases where conservative methods are not effective, other specialized surgical methods including local anesthetic blocks, selective C2-C3 blockade, chemical neurectomy, cryoneurolysis, surgical neurolysis of GON, dorsal rhizotomy and neurectomies with very specialized practitioners may be used to abolish pain. The diversities of anatomic areas affected with pain may also lead patients to seek medical assistance with ophthalmologists, ENT specialists, neurologists and orofacial pain specialist[14]. Because refractoriness to pain treatment using conservative methods is frequently observed in ON patients[19], it is very common that such patients be referred for additional consultations with professionals of the health care system. Because pain in ON is very intense, protracted and unbearable it is common that such patients be referred to pain specialists in an hospital environment[13,14]. In fact, many subjects in the ON group freely reported that occasionally they have been taken to an hospital facility to get some relief of their persistent and unbearable pain.

CMDs and ON subjects in the current study more frequently consulted ENT specialists as compared with TTH individuals.

In the current investigation, it was found that ON patients as compared to TTH subjects, consulted a greater number of ENT specialists. It may be that the complex neurophysiology of ON, severer pain and central excitatory effects affects in some way certain neurophysiologic structures and neural pathways which in turn cause symptoms in the ear structures. Such symptoms include earache, ear stuffiness, dizziness, vertigo, impaired hearing or partial deafness, and tinnitus. There are many investigations supporting a relationship between occipital neuralgia and ear disorders. Supporting this assumption, one investigation[17] indicates that the complex connections of the occipital nerve with cranial nerves VIII, IX, V and X, may explain some symptoms such as tinnitus, pain and dizziness frequently observed in subjects with signs and symptoms of ON. In line with this previous point of view one investigation[13] reported that very severe pain in ON patients may also be felt deep in the ear. Pain inside the ear canal may occur concomitantly with pain in the TMJ in ON patients[13]. It has been reported that there is a clear association between pain and ear symptoms including dizziness and vertigo in ON patients[9]. One recent investigation[13] asserts that due to the connections of the greater occipital nerve with nerves VIII, IX and X cranial nerves and the sympathetic cervical ganglion, tinnitus, dizziness and other symptoms occur frequently in ON patients. Even though no ear abnormalities may be observed when a ON patient is examined by an ENT specialist[13], a complain of severe pain and other ear symptoms including dizziness and vertigo[9] are reported frequently by ON patients encourage them to seek medical assistance with ENT specialists. Due to convergence mechanisms of the C2 dorsal root and the trigeminal subnucleus caudalis with nerves VIII, IX and X cranial nerves and the upper cervical ganglion, symptoms like tinnitus, dizziness, vision impairment and ocular pain may occur[16]. Thus, CMDs and ON patients are very likely to seek further medical assistance with other health professionals including ENT and ophthalmologists. Findings in the current study regarding greater number of consultations with ENT specialists are in line with the clinical observation that ear disorders predominante in individuals presenting with signs and symptoms of CMDs and ON.

VI. Conclusion

The outcome of this retrospective cross-sectional study carried out in a group of CMDs and ON subjects and a parallel comparison group (subjects with CMDS + TTH), indicates that ON is a recalcitrant and refractory neuropathic disorder characterized by very severe pain, use of larger amounts of different pain killers, muscle relaxants and antidepressants. Patients with this pain condition are more likely to seek diagnosis and treatment with different health professionals in different clinical settings including neurologists

and ENT specialists in private practice or in a hospital setting. CMD and ON subjects seem to benefit the most when their cases are evaluated and managed by a multidisciplinary medical team. Further studies are needed to corroborate findings in the current investigation adding to the current understanding about the diagnosis and treatment of ON.

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Table 1: Factors of age and genre in CMDs and ON subjects (n=80) and in those presenting with CMDs and TTH signs and symptoms (n=100).

	CMDs + ON=80	CMDs + TTH=100
AGE		
Mean	39,9	30,0*
SD	10,2	11,3
Range	15-75	14-60
GENRE		
Females	78	94**
Males	2	6
Totals	80	100

*Mann-Whitney test (p<0,0001), an statistically extremely significant difference

** Fisher's exact test (p=0,30), a non statistical significant difference.

Table 2: Illustrative table showing pain killers, muscle relaxants, benzodiazepines, and antidepressants use in the CMDs + ON (n=80) and CMDs + TTH (n=100) groups.

	CMDs + ON=80	CMDs + TTH=100
PAIN KILLERS (PK)		
Mean	3,4	1,9*
SD	1,7	1,5
Range	0—6	0—7
N subjects that used PK	76/80	80/100**
M.RELAXANTS		
Mean	1,2	1,0***
SD	1,0	1,2
Range	0—4	0—5
N subjects that used	59/80	54/100****
BENZODIAZEPINES		
Mean	0,27	0,25*****
SD	0,57	0,61

Range	0—3	0—3
N subjects that used	18/80	18/100*****
ANTIDEPRESSANTS		
Mean	0,63	0,33*****
SD	0,80	0,70
Range	0—3	0—4
N subjects that used	37/80	25/100*****

*Mann-Whitney statistics (p<0,0001), an extremely significant difference

**Fisher’s exact test (p<0,004), a very statistically significant difference.

***Mann-Whitney statistics (p<0,03), a statistically significant difference .

****Fisher’s exact test (p<0,008), a very significant difference

*****Mann-Whitney statistics (p=0,66), a non significant statistical difference

*****Fisher’s exact test (p=0,46), a nong significant difference.

*****Mann-Whitney statistics (p<0,01), a statistically significant difference

*****Fisher’s exact test (p<0,004), a very significant difference.

Table 3: Illustrative table showing number of consultations with different health professionals including ENT specialists according to report by CMDs and ON (n=80) and CMDs and TTH subjects (n=100).

	CMDs+ON n=80	CMDs+TTH n=100
CONSULTATIONS		
Mean	3,3	2,0*
SD	2,4	1,7
Range	0—16	0—12
ENT SPECIALISTS		
Yes	28	9**
No	52	91
Totals	80	100

*Mann-Whitney statistics (p<0,0001), an statistically extremely significant difference.

**Fisher’s exact test (p<0,0001), an statistically and extremely significant difference.

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