

## Addressing Non-Responding Chronic TMD Patients Experience from a Multidisciplinary Approach

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### ARTICLE INFO

Received Date: September 21, 2017

Accepted Date: November 02, 2017

Published Date: November 15, 2017

### KEYWORDS

TMD;  
Multidisciplinary;  
TMJ

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**Citation this article:** Rosén A, Lund B, Berge T. Addressing Non-Responding Chronic TMD Patients Experience from a Multidisciplinary Approach. J Otolaryngol Res. 2017; 1(2):116.

### ABSTRACT

Temporomandibular disorder (TMD) is a condition that encompasses muscular facial pain and functional disturbances of the mandible. There has been uncertainties about the interface between the different professions, and it can be unclear who is responsible for the patient. In addition different diagnostic tools to aid treatment decision have been developed during the years, without reaching a final agreement.

The Norwegian Directorate of Health assigned the Oral and Maxillofacial Surgery Department together with the pain Clinic at Haukeland University Hospital in Bergen, Norway, to develop a multidisciplinary program involving both dental and medical specialists. The goal was to systematize the investigation and treatment for patients with TMD. This study will present the first 60 TMD patients that were included in the project. Since it's debated, especially among dental specialists, whether surgery is an appropriate treatment for this type of patients we focus on those with TMJ derangement/diseases (TMJD) who were included for surgery.

A multidisciplinary team evaluated sixty patients from all health regions in Norway. A comprehensive questionnaire regarding medical history, psychosocial- and life style factors was completed prior to three days of clinical examinations. Finally, at the 4th appointment the assessment results and treatment suggestions were presented for and discussed with the patient and a detailed final report was sent to the referring GP.

The majority of patients were advised conservative TMD treatment. Seven patients needed surgery. After conservative treatment, seven patients were subjected for surgery at the OMS clinic. One-year follow up showed that one patient recovered from pain with good function of the jaw. Five patients were still in pain but had gained a better function. One patient did not meet at the follow up. In conclusion, refractory pain in TMD patients will benefit from a multidisciplinary approach. Since chronic TMD patients are high risk for non-response to surgical treatment diagnostic surgical criteria are important in the effort to use the most efficient surgical procedure as well as psychosocial pre-screening to avoid persistent postsurgical pain.

### INTRODUCTION

#### 1. Background

Temporomandibular Disorder (TMD) is a condition that encompasses muscular facial pain and functional disturbances of the mandible. TMD is an umbrella term containing several diagnoses and therefore difficult to grasp [1-3]. Besides myofascial pain TMD also includes internal derangements of the temporomandibular joint (TMJ) and affects approximately 20 % of the population, with a strong unexplained female predominance [4]. In Norway with a population of 5.3 million, there are no data for the prevalence of TMD though there are two studies that have estimated the total prevalence of TMD (12%) and painful TMD (7%) in adolescence [5,6].

The condition is presented as a mechanical or inflammatory disturbance such as monoarthritis or systemic rheumatic disease affecting the TMJ. Other diagnoses of the TMJ that requires treatment are osteoarthritis, recurrent mandibular luxation and ankyloses [7]. The main complaints are TMJ pain and impaired function including reduced mouth opening and inability to chew properly, which may have significant impact on subjective rating of pain and quality of life [3,8].

Different diagnostic tools have been developed during the years, without a final agreement [9-11]. One reason could be that this type of patients seek healthcare both in dental and medical care systems while the communication between the involved systems is sparse. There is also uncertainty about the interface between the different professions, and it can be unclear who has the main responsibility for the patient. Furthermore, various dental specialists tend to offer treatment within the limitations of their field of odontology rather than considering a multi-professional approach. Dental practitioners tend to see the jaws, the joints and the mouth as an isolated part of the body while the medical practitioners are more prone to include it the holistic view of the patient excluding the oral cavity and related structures. The TMJ has sometimes been denoted as "the forgotten

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joint", left for dental specialists to care for.

In Norway, patients with TMD organized a patient association, The TMD Society, because of the apprehension that their condition was neglected in the healthcare system. The TMD patients were seeking care at the primary health service or the primary dental service but there were no national guidelines for how to investigate and treat the patients. Specialists in Oral and Maxillofacial surgery have the responsibility of this patient group when it comes to surgery but for patients with solely muscle pain the Dental health service lacks competence, i.e. specialists in orofacial pain. Some patients seek treatment abroad. This treatment consists of either conservative and/or surgical treatment. The conservative part of the treatment is a mandibular repositioning splint, to be used 24 hours per day with the purpose of moving the condyle forward and thereby relieving the joint from pressure and pain. Because of physical adaption by the dentition, this often results in loss of dental occlusion. Contacts between opposing teeth is lost, seriously compromising mandibular function including chewing ability. The investigation abroad includes Magnetic Resonance Imaging (MRI), revealing the commonly occurring phenomena of a TMJ disc displaced anteriorly in the joint. Despite the fact that this is observed among 20% of the normal population, only occasionally causing symptoms, the displaced disc is surgically repositioned using plication technique. The treatment cost is immense and the patients treated abroad requests coverage by the Norwegian health insurance. The politicians are constantly lobbied by the TMD society and as a result the Norwegian Directorate of Health gave a mandate from the Ministry of Health and Care Service to initiate a program for these patients. The goal was to structure the investigation and treatment for patients with TMD. The Oral and Maxillofacial Surgery Department at Haukeland University Hospital in Bergen, Norway, got the assignment and developed a multidisciplinary program involving both dental and medical specialists. The Pain clinic at the hospital was invited and contributed with different specialists and the set up for how these patients should be assessed [12]. Four years later more than 120 patients have been through the extensive multidisciplinary investigation program. During the years 2013-2015 60 patients were examined, one patient a week, and in January 2017 a National unit for unresolved orofacial pain was set up at Haukeland University Hospital in Bergen.

This study will present the first 60 TMD patients that were included. Since it's debated, especially among dental specialists, whether surgery is an appropriate treatment for this type of patients we focus on the subset of patients with TMJ derangement/diseases (TMJD) who were subjected to surgery.

Experience from 60 patients in the National TMD project in Bergen

## 2. Description of the method

Sixty consecutive TMD-patients were included in the study. Berge and Rosén have earlier presented features of the multidisciplinary program published in all four Scandinavian Dental Journals [8]. Patients from all counties in Norway were referred from their general practitioner for the multidisciplinary program including both dental and medical specialists. The travel and treatment costs for the patients were covered by the national health care system. Each patient is charged an affordable user's fee. Patients were examined at the Department of Oral and Maxillofacial Surgery (OMS) by an OMS specialist and a dental specialist with expertise in TMD. At the Pain Clinic an anesthesiologist, a psychologist and a physiotherapist examined the patients. The evaluation was made after three days of examinations, one day a week, of scheduled appointments including imaging (MRI and orthopantomogram) and blood analyses.

Prior to the examination, the patients filled in a comprehensive questionnaire. The questionnaire included questions regarding medical history, previous treatments, pain intensity according to a visual analogue scale

(VAS, 0-10), pain drawing of illustrating affected body areas, Roland Morris scale concerning general disability [13] and questions about sleep disorders. Psychological questionnaires, such as the Hospital Anxiety and Depression scale (HADS) [14] and the two-item version of the Coping Strategies Questionnaire that indicated catastrophizing [15] were used. Further, the mandibular functional impairment questionnaire was included (MFIQ) [16].

Anamnestic information collected during the clinical consultations included focus on previous and current medical history, pain diagnosis, use of medication and lifestyle factors. Posture, ability to relax, physical fitness, joint flexibility, breathing pattern and psychological factors such as social context, depression, anxiety, catastrophizing and coping skills were assessed as well as duration of symptoms, both for pain and function, and consequences in general with a focus on TMJ and adjacent structures. The comprehensive questionnaire was thoroughly, from the angle of different specialist, scrutinized together with the patient at the visit. Finally, a dynamic feedback appointment was conducted at the 4th visit where the assessment results and treatment suggestions were presented for and discussed with the patient and its family, see flow chart of visits in Figure 1.



**Figure 1: The appointment flow for the patients investigated in the multidisciplinary team.**

## RESULTS

Females dominated the patient group, ratio 51:9, and the mean ages were 45 years (range 20-67). The female patients had long-term pain history, with a mean duration of 11 years (Median, range 1-39). The typical TMD patient is female, married, had two children and was from the eastern part of Norway. Education degree ranged from High school to university Bachelor degree. She is working in the service sector or, in a care profession and graded her economy as poor to medium. She had long lasting pain with general disability caused by pain and was uncertain about the cause of pain and triggering factors. The number of male was 10% of the entire group. The mean age was 41 years of age (range 24-56). They have had pain for 12 years (mean, range 2-34 years). Patient history revealed previous trauma in 45% of all patients and 25% reported general joint hyper mobility. Commonly reported comorbidities were pain from neck, shoulders and back in 88% of the TMD group, see further self-reported complaints and self-reported diseases in Tables 1 and 2.

**Table 1: Self-reported complaints.**

| Description                        | N=60     |
|------------------------------------|----------|
| Pain from neck, shoulders and back | 53 (88%) |
| Headache                           | 45 (75%) |
| Tinnitus                           | 22 (37%) |
| Pain elsewhere                     | 39 (65%) |
| Muffled hearing                    | 34 (57%) |
| Dizziness                          | 33 (55%) |
| Otalgia                            | 25 (42%) |

**Table 2: Self-reported diseases.**

| Description               | N=60     |
|---------------------------|----------|
| Arthritis in other joints | 25 (42%) |
| Allergy                   | 20 (33%) |
| Asthma                    | 9 (15%)  |
| Mental disorders          | 7 (12%)  |
| Cardiovascular disease    | 5 (8%)   |
| Rheumatic disease         | 5 (8%)   |
| Fibromyalgia              | 5 (8%)   |
| Irritable bowel syndrome  | 4 (7%)   |
| Chronic fatigue/ME        | 4 (7%)   |
| Dermatitis                | 3 (5%)   |
| Osteoporosis              | 2 (3%)   |
| Hypothyroidism            | 2 (3%)   |

For description of patient's previous treatments, see Table 3.

**Table 3: Previous treatments.**

| Treatment         | N=60       |
|-------------------|------------|
|                   | Dental/OMS |
| Splint            | 28         |
| Orthodontic       | 5          |
| Steroid injection | 5          |

|                        |                                   |
|------------------------|-----------------------------------|
| Arthrocentesis         | 4                                 |
| Local anaesthesia      | 4                                 |
| Orthognatic surgery    | 2                                 |
| TMJ discectomy         | 2                                 |
| Reconstructive surgery | 1                                 |
|                        | Medical/physiotherapy/ psychology |
| Physiotherapy          | 24                                |
| Chiropractor           | 15                                |
| Acupuncture            | 6                                 |
| Manuel therapy         | 6                                 |
| Botox injection        | 6                                 |
| Psychomotoric therapy  | 5                                 |
| Psychologist           | 4                                 |
| Neurologist            | 4                                 |
| Muscle exercise        | 4                                 |
| Trigger point therapy  | 2                                 |
| Muscle relaxantia      | 2                                 |
| Antibiotics            | 1                                 |

The clinical examinations at the OMS clinic revealed that almost all patients had moderate to severe jaw muscle pain and 85% had raised MFIQ scores, i.e. disturbances of the mandibular function. A total of 23 patients had occlusal interferences and 10 posterior open bite due to long-term use of an anterior mandibular repositioning splint (Table 4).

**Table 4: Clinical examination at the OMS clinic.**

| Symptoms                                      | Mean                  | N          | %  |
|---|-----------------------|------------|----|
| Muscle tenderness (0-5) left/right            |                       |            |    |
| m. pterygoideus lat.                          | 3.2/3.3               | 43/45      | 73 |
| m. masseter                                   | 2.0/2.0               | 24/24      | 40 |
| m. temporalis                                 | 2.6/2.7               | 36/38      | 62 |
| m. digastricus                                | 1.8/1.6               | 21/18      | 50 |
|   |                       |            |    |
| Mandibular movement                           |                       |            |    |
| Max inter incisal distance                    | 39.2 mm (range 13-60) | 28 (<40mm) | 47 |
| Deviation in jaw opening                      |                       | 23         | 38 |
| Occlusion                                     |                       |            |    |
| Posterior open bite                           |                       | 10         | 17 |
| Occlusal interferences                        |                       | 23         | 38 |
| Pathology in teeth and/or surroundings Caries |                       | 9          | 15 |
| Apical periodontitis                          |                       | 11         | 26 |
| Questionnaire MFIQ (max 28, cut off>7)        | 14p                   | 51>7       |    |

Abbreviations: Muscle tenderness on palpation (0-5, 0= no pain, 5= severe pain)

m= muscle; lat= lateralis; MFIQ= Mandibular function impairment questionnaire

MRI revealed that 52% had anterior disk displacement and 10% severe arthritis with degenerative joint changes.

Clinical findings at the Pain Clinic showed that on referral, 13% had a fibromyalgia diagnosis, 17% had migraine and 0.7% chronic fatigue. Results from the lab test showed that 13 patients had Vitamin D deficiency (S-25-Hydroxy Vit. D3 < 50 nmol/L). The clinical examination at the Pain

clinic revealed that more than 2/3 of patients had palpable trigger points, while 50% had impaired ability to relax. The majority reported sleep disturbances, 50% had raised anxiety and/or depression scores, and almost all had elevated catastrophizing scores (Table 5).

**Table 5: Clinical examination at the Pain clinic.**

| Results from the Pain clinic | (n)                  |
|------------------------------|----------------------|
| Diagnosis at referrals:      |                      |
| Fibromyalgia                 | 8                    |
| Migraine                     | 10                   |
| Chronic fatigue/ME           | 4                    |
| Medication at referrals:     |                      |
| Paracetamol/NSAIDs           | 32                   |
| Opioids                      | 20                   |
| Antidepressants              | 16                   |
| Benzodiazepines              | 9                    |
| Zopiclone                    | 8                    |
| Clonazepam                   | 3                    |
| Gabapentinoids               | 6                    |
| Topiramate                   | 2                    |
| Lab test:                    |                      |
| Vitamin D deficiency         | 13                   |
| IGF-1 raised                 | 1                    |
| Clinical investigation:      |                      |
| Physician                    |                      |
| Palpable trigger points      | 43                   |
| Physiotherapist              |                      |
| Reduced ability to relax     | 31                   |
| Protracted head position     | 36                   |
| Highcostal respiration       | 39                   |
| Dystonia                     | 1                    |
| Psychologist:                | (mean)(max)(cut off) |
| Questionnaire:               |                      |
| Anxiety*                     | 7.2 21 >8            |
| Depression**                 | 5.9 21 >8            |
| A+D                          | 13.0 42 13           |
| Catastrophizing***           | 7.8 12               |
| Disability                   | 7.2 24 7             |
| Sleep                        | 1.8 3                |

\*27% of the TMD patients scored >10 which is considered as moderate or serious

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\*\*\*The mean is high compared to other studies. In the Hunt study the score average <3.

The majority was eligible for conservative treatment, including awareness of parafunctions and instruction for muscle exercises. More than 50% were referred to a dental specialist with focus on TMD treatment. Lifestyle factors (sleep, physical activity and diet) and medication were addressed. Fifty percent of patients required referral for psychological treatment, which included increasing coping skills such as distraction and relaxation; building confidence and for cognitive issues to accept the situation with self-instructions and to deal with catastrophizing. A small number of patients required further investigation to exclude underlying medical conditions (Table 6).

**Table 6: Treatment suggestions from the Multidisciplinary examination.**

| Treatments                  | Physio-therapist | Pain doc-tor | Psycho-logist | TMD specialist | Ortho-dontist | Oral and maxillofacial surgeon |
|-----------------------------|------------------|--------------|---------------|----------------|---------------|--------------------------------|
| Psychomotoric treatment     | 23               |              |               |                |               |                                |
| Increased physical activity | 25               |              |               |                |               |                                |
| Physiotherapy               | 9 (last 30)      |              |               |                |               |                                |
| Adjust medication           |                  | 42           |               |                |               |                                |

|                                     |  |    |            |            |    |   |
|-------------------------------------|--|----|------------|------------|----|---|
| Sleep hygiene                       |  | 20 |            |            |    |   |
| Dietary advices                     |  | 15 |            |            |    |   |
| Referrals to other specialists      |  | 4  |            |            |    |   |
| Psychology treatment                |  |    | 36         |            |    |   |
| Psychiatric treatment               |  |    | 1          |            |    |   |
| Support from primary care physician |  |    | Almost all |            |    |   |
| Awareness/muscle exercises          |  |    |            | Almost all |    |   |
| Referrals to Dental specialist      |  |    |            | 50%        |    |   |
| Correction of malocclusion          |  |    |            |            |    |   |
| secondary to previous treatment     |  |    |            |            | 15 |   |
| Arthroscopy                         |  |    |            |            |    | 5 |
| Discectomy                          |  |    |            |            |    | 2 |
| Arthroplastic surgery               |  |    |            |            |    | 1 |

After conservative treatment for TMD at dental specialists, seven patients (12%) were subjected for surgery at the OMS clinic. Pre-screening for pain at rest and in movement together with psychosocial factors had been assessed before the first visit, see Table 7.

**Table 7: Pre-screened psychosocial factors in patients eligible for surgery.**

| Patient | Pain at rest /in movement | Roland M scale (0-24) | MFIQ (0-28) | HADS (0-42, 21+21) | Catastrophizing (6+6=12) | Sleeping problems (0-3) | Wakeups because of pain (n) |
|---------|---------------------------|-----------------------|-------------|--------------------|--------------------------|-------------------------|-----------------------------|
| 1       | Yes/yes                   | 2                     | 14          | 1+0=1              | 4+3=7                    | 1                       | 0-5                         |
| 2       | Yes/yes                   | 5                     | 14          | 11+9=20            | 5+5=10                   | 2                       | 0                           |
| 3       | Yes/yes                   | 8                     | 17          | 1+6=7              | 0+3=3                    | 2                       | 2-3                         |
| 4       | Yes/yes                   | 14                    | 19          | 1+3=4              | 5+5=10                   | 3                       | 3                           |
| 5       | Yes/yes                   | 3                     | 14          | 10+3=13            | 6+6=12                   | 2                       | 0                           |
| 6       | Yes/yes                   | 11                    | 26          | 14+5=19            | 5+4=9                    | 2                       | 7-8                         |
| 7       | Yes/no                    | 5                     | 9           | 11+4=15            | 3+3=6                    | 1                       | 0                           |

The results were addressed at the last appointment and treatment suggestions was sent to the general practitioner for conduction.

The TMJ diagnoses considered for surgical treatment were osteoarthritis (OA, n=1), painful clicking (PC, n=1) and chronic closed lock (CCL, n=5). Different surgical treatments were chosen depending on the diagnosis (see Table 8). Follow-up after one year showed that one patient recovered from pain and with a good function of the jaw. Five patients were still in pain, two had a good function and two with improved function. One of the latter patients was still not satisfied and went abroad for treatment with TMJ prosthesis. One patient did not show up for a follow-up (Table 8).

**Table 8: Diagnosis, findings and outcome of surgery.**

| Pat. No. | Age/ gen-der | MFIQ | Diagnosis/ Wilkes stages/ MIO (mm) | Surgery no. 1                 | Findings Arthroscopy OA/SYN/ ADH/ID | Follow up Pain/ function  | Surgery no. 2 | Follow up 1 year Pain/function | Further                 |
|----------|--------------|------|------------------------------------|-------------------------------|-------------------------------------|---------------------------|---------------|--------------------------------|-------------------------|
| 1        | 31/F         | 14   | CCL IV MIO 30                      | Arthro-scopy lysis and lavage | OA2/SYN2/ ADH/ID                    | 1 year Severe/ MIO 40     |               |                                |                         |
| 2        | 64/F         | 14   | CCL IV MIO 30                      | Arthro-scopy lysis and lavage | OA2/SYN2                            | Did not show up           |               |                                |                         |
| 3        | 41/F         | 17   | CCL III MIO 30                     | Arthro-scopy lysis and lavage | OA2/SYN2/ ID                        | 6 months Severe/ MIO 38   | Disc-ectomy   | Moderate/ MIO 40               | TMJ prosthesis          |
| 4        | 50/M         | 19   | Spondylitis CCL IV MIO 25          | Arthro-scopy lysis and lavage | OA2/SYN2                            | 1.5 year Moderate/ MIO 31 |               |                                | Bi-lateral arthro-scopy |
| 5        | 27/F         | 14   | OACCL IV MIO 25                    | Gap-osteotomi                 | –                                   | 6 months Moderate/ MIO 25 | Arthro-plasty | Mild/ MIO 35                   |                         |



|   |      |    |                     |                                  |          |                             |  |  |  |
|---|------|----|---------------------|----------------------------------|----------|-----------------------------|--|--|--|
| 6 | 31/F | 26 | PC<br>III<br>MIO 32 | Disc-ectomy                      | --       | 1 year<br>Severe/<br>MIO 50 |  |  |  |
| 7 | 55/F | 9  | CCL<br>IV<br>MIO 33 | Arthro-scopy<br>lysis and lavage | OA2/SYN2 | 1 year<br>Non/<br>MIO 40    |  |  |  |

Abbreviations: MFIQ= Mandibular Functional Index Questionnaire: 7 questions, 0-4 points for each. Max 28 points, cut off  $\geq 7$  [16].

CCL= Chronic Closed Lock of the disc, PC= Painful Clicking of the disc [18].

Wilkes criteria for internal derangement of TMJ, stages I-V [9].

Arthroscopy findings: Osteoarthritis (OA, 0-2), Synovitis (SYN, 0-2), Adhesions (ADH) and Internal derangement (ID) [33].

Arthroplasty with resection of the pathological part of the condyle with insertion of temporalis flap.

Pain intensity in four stages: non-, mild-, moderate-, or severe pain.

MIO= Maximum incisal opening (mm), i.e. function of the mandible.

## DISCUSSION

This descriptive study present a group of patients referred for a multidisciplinary examination at Haukelands University Hospital in Bergen, Norway. All patients had a long history of pain. Females dominated and a majority had impaired mandibular function, in addition to pain. Chronic, widespread pain and muscular trigger points were common, as was an impaired ability to relax. Almost all patients had elevated catastrophizing scores. In the majority of cases conservative treatment was advised.

TMJ consists of two synergistically acting condylar synovial joints allowing motion in three axes, transversal, sagittal and vertical. It's characterized by a combination of rotation and translation upon mouth opening [17]. Unlike other joints of the body, the TMJs cartilage is fibrous and innervated by cranial nerves. Normal function of the TMJs is essential for important functions such as eating and drinking, but also for social activities such as talking, laughing, singing and kissing. It is also in an area where all the senses are located, such as taste, smell, vision, hearing and sensibility, which may disrupt your integrity if pain and dysfunction are present. Several studies have reported of severe impact of quality of life for patients with impaired and painful TMJ function [3,8].

After the proposed conservative treatment, 12% were included for surgery. That is a higher percentage compared to other studies of populations with TMD where figures of 1-5% have been described [18]. A possible reason for the high percentage could be that this patient group had an accumulated urgent need for care, and may as such represent a more severe subpopulation of TMD patients, compared to other studies. Probably, they hadn't previously been diagnosed correctly, due to clinician's disagreement of present diagnosis criteria and the lack of interplay between different health care disciplines. In the absence of proper diagnose and delayed treatment decisions, the suffering patients may be subjected to extensive circulation in the health care system, without any consensus from the clinicians. Another reason could be that there have not been any TMD guidelines for treatment in Norway prior to this study. The assignment from the Norwegian Directorate of Health included the making of guidelines that are now available for the primary health- and dental care which can ease the health care burden and reduce patient suffering.

First choice of treatment in TMD is conservative with focus on tense facial muscles. Awareness of parafunctions, muscle training and in some cases a splint may relieve muscle pain. Patients not responding to conservative treatment may be subjected for surgery. The reported overall success rate for TMJ surgical interventions is approximately 80% [18]. Suggested surgical treatments ranges from joint injections and arthroscopy to open joint surgery with or without autologous or alloplastic reconstruction [19-27]. However, both diagnostics and surgical intervention is a matter of vivid debate [11]. Thus, the etiology, classification, preferred treatment, risk factors for deterioration and non-responding outcome of treatment are current knowledge-gaps in Oral and maxillofacial

surgery according to a recent systematic review [28]. Furthermore, the group not responding to surgical treatment is largely uncharacterized.

Contradictions regarding clinical characterization, the results are of questionable clinical relevance [23]. The most frequently used diagnostic classification system within OMS surgery, Wilkes stages, does not fully reflect today's view of TMJ diseases concerning sequence of symptoms, structural changes and clinical findings [9]. Although an important effort, the most recent classification system is based on the assumption that there is a positive correlation between disease severity and presumed effects of invasive procedures [10]. The DC-TMD classification with its detailed description of the clinical examination also has shortcomings. The presentation of validity and sensitivity figures gives an incorrect impression of statistical and mathematical exactness. It may be a useful tool in research, allowing inter-study comparison but can be perceived as cumbersome in the routine clinical situation and does not result in a treatment algorithm. Another diagnostic criteria system has tried to classify the appearance of the TMJ, from different imaging techniques, and connect it to certain surgical procedures [11]. Although important efforts, characteristic for all the currently available classifications of TMJ diseases is that they are based mainly on experience and opinion of the authors rather than research. Besides hampering TMJ surgery, it has the consequence that most studies can neither be compared nor repeated rendering systematic assemble of data impossible. With the current classification systems the risk is evident of either withholding surgical intervention from the patient or result in a too invasive surgical treatment irreversibly affecting the joint function.

The international Association for the Study of Pain (IASP) has for long time urged for preoperative psychosocial screening in each patient that is eligible for surgery to avoid that postoperative pain will develop into chronic pain. Extended surgical procedures, fear of pain, expected pain and pain catastrophizing are all "red lights" prior to surgery [29-33]. It is better to treat psychological disorders first and then perform surgical treatment. The same is for patient in pain. If the patient score high ( $>4$  on a visual analogue scale, 0-10), the pain has to be treated before they are selected for surgery, to avoid persistent postsurgical pain.

In our study, seven patients had clearly signs of TMJ diseases. After conservative treatment, they were included for surgery. As a first choice of treatment, arthroscopy was chosen in five patients, one patient went further for discectomy. One patient with painful clicking had discectomy as the first surgical choice. One patient had prior to the investigation been treated with discectomy so the choice this time was gap osteotomy. The patient did not recover and a second operation was performed, arthroplasty with partial condyle resection and temporalis fascia transposition. The follow-up after one year showed mixed results. Only one out of six (one did not show up at the follow up) reached a pain free state and a good function of the mandible. The prognosis for surgical treatment in

patients with a long history of pain is uncertain. Psychosocial factors including life style have a great impact in how the patient will recover. Therefore, it is of great importance to pre-screen patients before they will be eligible for surgery. Prepare the patient for the treatment that they will go through with and follow the patient after thoroughly afterwards. Then surgical treatment can be more predictable for the outcome result.

## FUTURE PERSPECTIVES

A three years follow-up study of the same group of the 60 patients we have presented is in progress. The results will be presented later on with focus on if the conservative treatment that was proposed from our multidisciplinary team has successfully been performed via the general practitioner.

## CONCLUSION

Refractory pain in TMD patients will benefit from a multidisciplinary approach. For patients that need surgery, diagnostic surgical criteria are important in the effort to reach the right surgical procedure as well as psychosocial pre-screening to avoid that persistent postsurgical pain. By improving the oral and maxillofacial surgery care of these patients, a reduction in patient suffering is expected as well as lower costs for health care and society. A reduce in health burden on related areas where these patients often seek help can be expected, such as in ENT, rheumatology, anesthesiology (pain clinics), neurology, oral physiology, general dentistry and physiotherapy.

## ACKNOWLEDGEMENT

Present and former colleagues from the multidisciplinary team at the Haukeland University Hospital and at the Haraldsplass Deaconess University Hospital in Bergen, Norway are greatly acknowledged. From the Oral and Maxillofacial Surgery Clinic: Anders Johansson, Ulrik Leidland Opsahl, Toril Torvund, Christin Thompson, Britt-Marie Hansen, Arne Grønningsæter, Daina Fitins, Tanja Rajic Riise. From the Pain Clinic: Borrik Schjødt, Anne Grethe Paulsberg, Shna Abdulkarim, Wera Geoghegan, Rae Bell. From the Radiology Department: Gunhild Aandahl, Jonn Terje Geitung

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