1 Introduction

‘Temporomandibular disorders’ is a generally accepted term used to designate the disorders of the mandibular locomotor apparatus. For convenience, disorders of the temporomandibular joint proper are commonly distinguished from non-articular disorders, which most frequently affect the masticatory musculature. The most common disorder affecting the temporomandibular joint is osteoarthritis. Symptomatically, temporomandibular joint osteoarthritis is primarily characterized by joint pain (arthralgia), probably associated with an inflammatory response of the synovial membrane to the increased production of degradative products (synovitis). Secondarily, the pathological process may give rise to mechanical derangements, which may involve a displacement of the articular disk, but also derangements may be due to adherence phenomena or to the formation of adhesions within the joint or its capsule. Disk derangements are generally distinguished in disk displacement with reduction (i.e., during its translatory phase, e.g. on opening, the disk is reducing from a displaced to its ‘normal’ position) and disk displacement without reduction (i.e., the disk remains in a displaced position during any joint movement). Joint pain and mechanical phenomena, which are related to the commonly observed signs of interference with or without restriction of mandibular movements, are likely to be associated with an impairment of mandibular functions. Therefore, the treatment of temporomandibular joint osteoarthritis is usually aimed at improving mandibular function by reducing pain and enhancing joint mobility.

Physical therapy is, in addition to initial therapeutic measures such as reassurance, load reducing instructions and pain medication, one of the most commonly applied non-invasive treatment modalities in patients with temporomandibular joint osteoarthritis associated with non-reducing disk displacement. During the past decades, minimally invasive modalities, including arthrocentesis and arthroscopic surgery, have been introduced as successful therapeutic interventions for this patient group.
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The selection of the most favorable therapeutic intervention for disorders characterized by pain, restricted movement and function impairment of the temporomandibular joint is a matter of clinical decision making. The clinicians’ considerations in making that decision involve several important aspects. First of all, the clinician must assess which one of the variables is the most representative variable for the disease of the patient. In addition, he or she has to decide to what extent each of these variables depart from ‘normal’ values. Besides this diagnostic problem, which is not subject of this thesis, the clinician must select the most appropriate intervention to restore the mandibular function.

To do so, he or she should have an idea to what extent an intervention can be expected to lead to pain reduction and increase of mobility. After re-evaluating the patient following treatment, it must be decided to what extent the relevant outcome variables must change for the intervention to be considered effective. No consistent measure of improvement, nor an operational definition of “success” which informs the clinician about the ‘statistically and clinically significant change’ in the individual patient is available in the temporomandibular joint field.

To detect a statistically significant change in an outcome variable, consistency of the measurement results is obligatory. Many relevant outcome variables, such as pain, are multidimensional biological variables, which can be influenced by factors such as movement, pressure, temperature, emotions and the social environment. Furthermore, the data depend on several aspects of the observatory circumstances, e.g. the patient, the observer, the moment of measurement and the instrument (Mitchell, 1979; Sackett, 1985) All of these facets interact with the observed score and may contribute to the variation around the true score known as measurement error. Most clinicians (including physical therapists, dentists and oral and maxillofacial surgeons) are not sufficiently aware of this measurement error and that it affects their clinical decisions (Hayes, 1992).
There is wide agreement that the intervention of choice in a given clinical situation should be based on the best possible evidence available (Evidence Based Medicine; Sackett and Rosenberg, 1995; Fletcher and Sackett, 2000). In addition, it is recognized that the best evidence for the efficacy of a treatment modality should be obtained from randomized clinical trials, i.e., from a design with random assignment to the experimental group (undergoing the intervention to be analyzed) and an otherwise comparable control group. In addition, there is a need for a measure that can be applied in individual cases to make a priori and a posteriori judgement, i.e., to estimate the chance of success of a certain intervention or to judge whether an intervention has been successful or not. Applying such a measure as a basis for the outcome of common treatment modalities in patients with temporomandibular joint osteoarthritis associated with non-reducing disk displacement in a randomized clinical trial would provide more uniform information, both with respect to the treatment modality as such and in clinical decision making in individual cases.

A treatment strategy should be based on the diagnosis and the best possible evidence available with regard to the efficacy of the intervention. The treatment of temporomandibular joint osteoarthritis should aim at changes in outcome variables, such as mouth opening, pain and function impairment, to an extent that both the clinician and the patient are sure that “something has happened”. Currently, there is no measure available that informs about statistically significant change in the individual patient. The aim of this thesis was to evaluate the smallest detectable difference for clinical application in individual patients with temporomandibular joint osteoarthritis, as well as in patient groups treated with different interventions in a randomized clinical trial. More specified:
The aims of this study were:

- to review the available literature and identify evidence for non-invasive and minimally invasive treatment modalities in patients with painfully restricted temporomandibular joint function (Chapter 2);
- to analyse the smallest detectable difference in previously used outcome variables related to a painful restriction of the temporomandibular joint (Chapter 3);
- to analyse the reliability of instruments to measure maximal mouth opening, pain and function impairment of the temporomandibular joint using the generalizability theory and to determine their smallest detectable difference (Chapter 4, 5 and 6);
- to analyse, in a randomized clinical trial, the effects of physical therapy and minimally invasive treatment modalities (arthrocentesis and arthroscopic surgery) in patients with temporomandibular joint osteoarthritis associated with non-reducing disk displacement using the smallest detectable difference (Chapter 7).
References

http://cebm.jr2.ox.ac.uk/docs/levels.html


