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Shoulder complaints in general practice. Diagnosis and treatment

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Summary

In the first part of this thesis the results of a descriptive study on the diagnosis, course and treatment of shoulder complaints in general practice are described.

The literature studies regarding the influence of the mobility of the cervical spine, the upper thoracic spine and the upper ribs (the shoulder girdle) on the scapulohumeral joint, and the effect of NSAID's and corticosteroid injections in the treatment of shoulder disorders are described in part two. Finally, in part three the results are presented of a comparative study regarding the treatment of shoulder complaints in general practice with physiotherapy, manipulative therapy and injection therapy.

Part I

Chapter 1. 101 patients with shoulder complaints were examined and diagnosed according to the criteria of the National Guidelines for Shoulder Complaints of the Dutch College of General Practitioners. These Guidelines were published in 1990 and distinguish four diagnostic groups and one restgroup. The four diagnostic groups are: Capsular syndrome, acromioclavicular syndrome, acute bursitis and subacromial syndrome. The patients that could not be classified into the diagnostic groups described in the Guidelines, had some additional physical diagnostic tests performed. With this extra information a new attempt to classify these patients into the diagnostic groups of the Guidelines was made. Again a group of patients could not be diagnosed according to the classification of the Guidelines. In this remaining patient group the findings of the physical examination of the shoulder girdle were also included in the diagnostic process.

Together with the extra diagnostic tests 47 patients could be classified into the diagnostic groups of the Guidelines. Especially the impingement sign and test were useful in discriminating between the diagnostic groups. In 32 patients combinations of diagnoses were found, in 11 a combination of Guidelines diagnoses and in 21 a combination of Guidelines diagnoses and a disorder in the shoulder girdle. In 22 patients with shoulder complaints no abnormalities in the structures of the scapulohumeral joint could be found, i.e. the complaints were caused by functional disorders in the shoulder girdle. In the course of time a shift of diagnosis was seen toward the group with functional disorders of the shoulder girdle. Based on these results it was concluded that the Guidelines for Shoulder Complaints were not suitable for use in general practice and a new diagnostic classification was presented as follows:

- 1 Synovial disorders: Complaints are caused by disorders in the glenohumeral joint, the acromioclavicular joint, the subacromial space or combinations thereof.
- 2 Shoulder girdle disorders: no abnormalities are found in the synovial structures; the complaints are caused by functional disorders in the shoulder girdle.

3 Combination disorders: Both a synovial disorder and a functional disorder of the shoulder girdle are causing the complaints. It is impossible to determine which structure is responsible for the complaints.

The disorders in this classification are not assumed to be clearly distinct syndromes, but disorders that are interchangeable.

In *chapter 2* the patient characteristics of the study group are described. The incidence was 22 per 1000 patients per year. The average age was 47.3 year. More women than men suffered from shoulder complaints, although in the age group of 45-65 this was the opposite. The average age of the patients with a synovial disorder was higher and these patients reported pain during exertion and at night, with short onset. The pain was felt in dermatome C5, C7 and Th2. The patients with a shoulder girdle disorder had long term complaints before first consultation and experienced pain mostly in C4 and Th4 with sensations of tingling and numbness. The patients with a combination disorder experienced pain in C5, C7 and Th2 during unstrained motion. Numbness was more often experienced than in the other diagnostic groups.

In *chapter 3* the items of the physical examination that contribute most to the diagnosis are described. Inspection and resistance tests did not contribute to the diagnosis. Palpation findings were of limited use. The active and passive testing of the range of motion of the scapulohumeral joint (ROM) was very helpful in discriminating between a synovial disorder and a shoulder girdle disorder. No specific pattern in the limitation of the ROM could be detected. Only pain when lifting the shoulders and an extended arc were useful in distinguishing a combination disorder. It is becoming more difficult to distinguish a combination disorder from a synovial disorder if only slight limitations in the ROM are present.

In *chapter 4* the classification of shoulder complaints is made with the use of a cluster analysis of 11 variables of the medical history and 19 variables of the physical examination. The analysis is done twice, firstly with the data of the first examination and secondly, with the data of the examination after two weeks. During that period the patients were treated with NSAIDs. The first analysis showed three stable clusters:

- 1 A cluster with almost half of the patients. These patients hardly showed any limitations in the ROM.
- 2 A cluster with 7 patients with very acute and severe complaints and average to severe limitations in the ROM.
- 3 The last cluster contains the rest of the patients who showed slight to average limitations in the ROM.

The second analysis also showed three stable clusters with again a large cluster of patients that hardly have any limitations in the ROM. Also a small cluster was found with limitations in practically all the ROM, but now these limitations were slight to average. The third cluster contains the rest of the patients with none to slight limitations in the ROM.

The findings of the physical examination were not constant in the course of time as can be concluded from the decreasing limitations in the ROM and the shifts of pa-

tients within the clusters in week zero and in week two. The results correspond with our clinical findings that no fixed patterns in the limitations of the ROM could be detected and there is also a group with hardly any limitation of the ROM. As only three stable clusters could be identified and no specific patterns in the limitation of the ROM could be found, it seems doubtful whether more elaborate classifications for diagnosing patients with shoulder complaints, such as the Cyriax classification or the National Guidelines for Shoulder Complaints, are useful.

Chapter 5 assesses the role of the structures of the shoulder girdle as a causal or an influential factor in the development of shoulder complaints. In this study the results of the physical examination of the shoulder girdle in a group of patients with shoulder complaints at first consultation were compared with the same group of patients after 26 weeks when 80% of the patients felt cured, and with a group of test patients without shoulder or neck complaints.

It appeared that in the test group the mobility in the cervicothoracic spine decreased with ageing. Significant differences were found between the test group and the group of patients with shoulder complaints at first consultation as well as after 26 weeks.

In the patient group all types of shoulder complaints showed functional disorders in the shoulder girdle, whereby the emphasis was on pain at the time of first consultation and on restricted mobility after 26 weeks. This means that the shoulder girdle as a causal or an influential factor on shoulder complaints should be considered as part of the intrinsic causes of shoulder complaints. It may be advisable to include treatment of functional disorders of the shoulder girdle, aimed at restoring the mobility, in treatment of patients with all types of shoulder complaints.

In *chapter 6* the development and application of the shoulder pain score is described. This is a 6-item questionnaire together with a 101-point numerical pain scale. The 6 questions: pain at rest, pain during motion, pain during the night, sleeping problems owing to pain, inability to lie on the affected side, and presence of radiated pain were scored on a 4-point scale of severity. The score on the 101-point numerical pain scale was also converted onto a 4-point scale in order to calculate the sumscore of the shoulder pain score. (Between 7 points (no pain) and 28 points (severe pain)).

The internal consistency was high (Cronbach's $\alpha=0.82$).

With a factor analysis two factors were found: One containing the 'passive' items of the shoulder pain score, i.e. pain at rest, nightly pain, pain while lying and sleeping problems owing to pain; the other containing the 'active' items of the shoulder pain score, i.e. pain in motion, radiation of the pain and the numerical pain scale.

The contribution of these two factors to the total pain score remained constant during the whole test period of 25 weeks.

It appeared that with a pain score between 7 and 10, 80% of the patients felt cured. 'Feeling cured' was defined as the disappearance of shoulder complaints or decrease of shoulder complaints to such an extent that the complaints were no longer inconvenient, or required therapy, and/or no longer interfered with normal work duties. The average score of the patients still having complaints was between 13 and 15. Ap-

parently the margin between feeling cured and having complaints is a very narrow one.

In *chapter 7* the impact of having shoulder complaints on a patient's daily activities is discussed. With the Sickness Impact Profile (SIP), the Daily Activity List (DAL) and the COOP/WONCA charts the functional status was assessed at the time of inclusion in the study, in week 6 and in week 26. Also the amount of pain was established with the shoulder pain score.

The SIP is a questionnaire consisting of 136 questions in twelve categories. The twelve categories are divided into three dimensions, viz. physical (walking, body care and mobility), psychological (emotional behavior, social interaction, alertness/intellectual functioning and communication) and the independent categories (working, sleeping/resting, housekeeping, leisure and eating). The DAL consists of 11 yes/no questions with which impediments in daily activities are determined, e.g. walking stairs, lifting and body care. The COOP/WONCA function charts consist of 6 charts with which one can quickly get a valid and reliable impression of the physical fitness, mood, daily activities, social activities, health condition and change in the general health condition.

At first consultation, impairments were seen with daily physical activities, working, sleeping, housekeeping and recreation, when compared with the reference values for the Dutch population. At the end of the study when 80% of the patients felt 'cured', only a few subscales (daily physical activities and sleeping) showed relevant changes compared with the score upon inclusion.

A subgroup analysis showed that differences in the scores at first consultation and/or the course of the scores during the study period were caused by the elderly patients, the group with the most pain, the group with a synovial disorder, the group with a short history of complaints and the female patients.

It appeared impossible to distinguish the patients who at week 26 felt cured, and the patients who still had complaints with the DAL and the SIP. This could only be done with two subscales of the COOP (general health and physical fitness) and with the shoulder pain score.

These results indicate that the SIP, DAL and COOP were not suitable for studying the functional health status in patients with shoulder complaints in general practice. A general practitioner can get an insight into the functioning of patients with shoulder problems by inquiring after sleeping problems owing to pain and pain with motion as is done in the shoulder pain score.

In *chapter 8* the duration of the shoulder complaints of the 101 patients is described. Also the influence of patient characteristics (age and sex), characteristics of the complaints (pain, history of the complaints and diagnosis) and the treatment are evaluated.

The first two weeks of the study all patients were prescribed NSAID's, after which the general practitioner was free to offer other options for treatment, based on the severity of the complaints and the findings during physical examination. These options included physiotherapy, injection therapy, manipulative therapy, or monitoring the

course of the complaints with a NSAID or paracetamol if needed. The patients were followed until they felt cured till maximal 25 weeks after inclusion. (For definition of 'feeling cured' see chapter 6).

After 6 weeks 50% and after 12 weeks 75% of the patients felt 'cured'. A subgroup analysis showed that the diagnosis and the therapy had significant influence on the duration of complaints. The shoulder girdle group had a shorter duration of complaints than the synovial and the combination group. Concerning treatment, it appeared that the group having no specific treatment had the shortest duration of complaints and the group getting more than one sort of therapy in the course of time had the most unfavourable duration of complaints.

In an analysis to establish the influence of all the variables described above, it appeared that the duration of complaints was significantly related to age and treatment.

With the results of this study it can be concluded that there is a group of patients with mild complaints that cure rapidly without further treatment. Also a group of patients exists with therapy resistant complaints that hardly respond to the various therapies offered.

In *chapter 9* the course of the pain on the shoulder pain score and the factors influencing this, are discussed.

The variables examined and the therapies given, are described in chapter 8.

The NSAID's prescribed during the first two weeks result in a rapid decrease in pain. The group with most severe pain took the most tablets which resulted in a significant decrease in pain, especially in the first week. The course of the pain from week 2 till week 8 in the patients still participating in the study, appeared to be significantly influenced by pain at inclusion, diagnosis and therapy. Severe pain diminishes more rapidly than less severe pain. Moreover, the therapy applied is related to the severity of the pain. The therapy group 'no treatment' is associated with a lower pain score than the other groups. The therapy group 'injection' has the fastest decline in the pain score. As to the diagnostic groups, the synovial group shows the slowest decline of the pain score.

It can be concluded that patients with average to severe shoulder complaints should be treated with a NSAID for one or two weeks, after which they should be re-evaluated. Depending on pain and diagnosis a new therapeutic approach should be started. In patients with only mild pain complaints no specific therapy should be offered.

In *chapter 10* the results are described of the examination after 26 weeks (the first follow-up examination) and the examination 12 to 18 months after inclusion in the study (the second follow-up examination). Also the influence of patient characteristics, recorded upon inclusion in the study, on the long-term course of complaints is evaluated.

In the first follow-up examination 52 patients still had complaints or had recurrent complaints of whom 32 experienced minor problems and felt 'cured' despite the complaints. The remaining 20 patients felt not 'cured'. They were considerably older, and had a longer history of complaints prior to first consultation.

For the second follow-up examination 94 patients returned the questionnaire. 55 patients had no complaints, 20 still had complaints but felt 'cured' and 19 did not feel 'cured'. Again, the not 'cured' group had a significantly longer history of complaints prior to inclusion in the study.

Both follow-up examinations showed that the diagnosis at inclusion had no influence on the long-term course of complaints. A diagnostic shift was seen towards the group of patients with functional disorders of the cervical spine and upper thoracic spine and the upper ribs (the shoulder girdle group). Although there was a slight tendency towards improvement, most of the patients with complaints at the first follow-up examination also had complaints at the second follow-up examination.

Part II

Chapter 11 describes the anatomy and the current views regarding the functional anatomy of the scapulohumeral joint and the structures of the shoulder girdle.

In *chapter 12* the results are presented of a literature study regarding the influence of the mobility in the cervicothoracic spine and the upper ribs (the shoulder girdle) on the mobility of the scapulohumeral joint. In a Medline and Embase search only eight relevant articles were found that referred directly or indirectly to a mutually influencing connection between the shoulder girdle and the scapulohumeral joint.

In these articles no direct evidence was found that the mobility of the shoulder girdle influences the mobility of the scapulohumeral joint. However, indications were found suggesting anatomical relations between the mobility in the shoulder girdle and the scapulohumeral joint, between the mobility in the cervicothoracic spine and the first rib and between the mobility of the cervicothoracic spine and the scapulohumeral joint.

Chapter 13 describes the results of a literature study regarding the effect of NSAID's on the treatment of shoulder disorders. With a Medline and Embase search 12 randomized trials were selected. NSAID treatment appeared more effective than placebo treatment. No differences were found between the various NSAID's. The greatest effect of NSAID's was seen in the first two weeks. No study was found comparing NSAID with paracetamol which makes it impossible to determine if the anti-inflammatory effect of a NSAID is always necessary in treating patients with shoulder disorders.

In *chapter 14* the results are presented of a literature study regarding the effect of corticosteroid injections in the treatment of shoulder disorders. 21 comparative studies were found in a Medline and Embase search. However, these studies could not be compared easily, owing to very differing, and often poor, methodology, patient selection and injection techniques. In 5 of the 21 articles positive results are reported. Most studies concern patients with frozen shoulders or involve patient populations of orthopedic surgeons, rheumatologists or specialists for rehabilitation me-

dicine. The question remains to what extent the results found in these studies, may be extrapolated to patients with shoulder complaints in general practice.

Part III

In this part the results are presented of a single blind randomized study comparing injection therapy, manipulative therapy and physiotherapy in patients with shoulder complaints in general practice.

All 198 patients entering the study were treated during the first week with a NSAID, after which the remaining 172 patients (25 had no complaints anymore, 1 dropped out) were divided into two diagnostic groups: The synovial disorder group and the shoulder girdle disorder group. In the two diagnostic groups randomization took place separately. The shoulder girdle patients were randomized over physiotherapy (n=29) and manipulative therapy (n=29) and the patients of the synovial group over physiotherapy (n=35), manipulative therapy (n=32) and injection therapy (n=47). The patients were followed until they felt 'cured', experienced a therapy failure, or until 12 weeks after randomization. All patients leaving the study were contacted by telephone 12 weeks after randomization, to inquire after present complaints and the Shoulder Pain Score was filled in if necessary.

In *chapter 15* the differences of the duration of the complaints in the various therapy groups are established by means of a survival analysis.

Regarding the shoulder girdle group the manipulative therapy group has a significantly faster recovery rate than the physiotherapy group. Drop-out due to therapy failure was with 20% in the manipulative therapy group significantly lower than 45% in the physiotherapy group.

In the synovial group the injection therapy group clearly had the best results. Drop-out due to therapy failure was high in the physiotherapy group and the manipulative therapy group, respectively 51% and 59%, versus 17% in the injection therapy group.

In some therapy groups the not 'cured' patient group is related to older age or longer history of complaints before first consultation.

Chapter 16 discusses the course of pain over time and the course of the limitations in the range of motion of the scapulohumeral joint (ROM) over time. The differences in the course of pain over time between the therapy groups and the factors influencing the course of pain were calculated with multi level analysis. In the shoulder girdle group the patients of the manipulative therapy group appeared to have a significantly faster reduction of the pain over time as compared to the patients of the physiotherapy group. In the synovial group the patients of the injection therapy group as well as the patients of the manipulative therapy group had a significantly faster reduction of the course of pain as compared to the patients of the physiotherapy group. Besides, in both diagnostic groups the decrease in pain was faster in men. In the shoulder girdle group the decrease in pain was less fast in the elderly patients.

The difference in the course of the limitations of ROM between the therapy groups was calculated with an analysis of variance of the repetitive measurements.

No difference in the course of ROM was found between the 'cured' patients of the three therapy groups in the synovial group. However, the decrease of the course of ROM was significant at every measurement in all synovial therapy groups. The difference in the course of ROM was significant in the patient group 'cured' and the patient group not 'cured'.

Considering the duration of complaints, the course of the pain over time and the number of patients 'cured', the overall conclusion is that in patients with a shoulder girdle disorder the therapy preferred is manipulative therapy and in patients with a synovial disorder injection therapy offers the best treatment results.