

## EXTENDED REPORTS

## Shoulder disorders in general practice: incidence, patient characteristics, and management

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**Abstract**

**Objectives**—To study the incidence and management of intrinsic shoulder disorders in Dutch general practice, and to evaluate which patient characteristics are associated with specific diagnostic categories.

**Methods**—In 11 general practices (35 150 registered patients) all consultations concerning shoulder complaints were registered during a period of one year. Patients with an intrinsic shoulder disorder who had not consulted their general practitioner for the complaint during the preceding year (incident cases) were asked to participate in an observational study. Participants completed a questionnaire regarding the nature and severity of their complaints. The general practitioners recorded data on diagnosis and therapy.

**Results**—The cumulative incidence of shoulder complaints in general practice was estimated to be 11.2/1000 patients/year (95% confidence limits 10.1 to 12.3). Rotator cuff tendinitis was the most frequently recorded disorder (29%). There were 349 incident cases enrolled in the observational study. Patient characteristics showed small variations between different diagnostic categories. Age, duration of symptoms, precipitating cause and restriction of movement seemed to be discriminating factors. Twenty two percent of all participants received injections during the first consultation; most (85%) were diagnosed as having bursitis. The majority of patients with tendinitis (53%) were referred for physiotherapy.

**Conclusion**—With respect to diagnosis and treatment, the practitioners generally appeared to follow the guidelines issued by the Dutch College of General Practitioners. Although the patient characteristics of specific disorders showed some similarities with the clinical pictures described in the literature, further research is required to demonstrate whether the proposed syndromes indeed constitute separate disorders with a different underlying pathology, requiring different treatment strategies.

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Shoulder complaints are encountered frequently in primary health care. The incidence

in Dutch general practice has been estimated at 12 to 25/1000/year.<sup>1-4</sup> The National Morbidity Surveys in England and Wales have reported a somewhat lower annual incidence of 6.6/1000.<sup>5</sup> A considerable number of episodes may not be presented to the health care professionals; reports of point prevalences in general populations range from 70 to 260/1000.<sup>6-9</sup>

A painful or stiff shoulder may be caused by various diseases and conditions, including neurological or vascular disorders, neoplasms, referred pain from internal organs, and disorders of the cervical spine (extrinsic causes). In most cases the complaints are of intrinsic origin, caused usually by articular or periarticular rheumatic conditions of the shoulder joint. The majority of patients are treated in primary health care, as intrinsic complaints often constitute a self limiting condition of relatively short duration (less than three months). The long term outcome is not always favourable: persisting pain or a limited range of motion in chronic conditions may last for several years.<sup>10-13</sup> In a community survey of shoulder disorders in the elderly, 108 patients were examined three years after the initial diagnosis: 74% showed persisting signs of their condition.<sup>14</sup>

The aetiology and pathogenesis of shoulder disorders tend to remain enigmatic. The complex anatomical and functional structure of the shoulder joint complicates identification of the source of the lesion. This has resulted in much confusion and lack of consensus regarding the classification of shoulder disorders. Terms such as periartthritis humero-scapularis, or a painful stiff shoulder, do not represent clearly defined clinical syndromes. Diagnostic criteria may even vary for disorders more straightforwardly labelled as rotator cuff tendinitis or subacromial bursitis. As a result, information on the incidence and disease characteristics of the various conditions of the shoulder joint is scarce, particularly regarding those patients encountered in primary health care; the bulk of the medical literature on shoulder disorders has been written by orthopaedists and rheumatologists and refers to hospital based populations.

In 1990, the Dutch College of General Practitioners issued clinical guidelines for the diagnosis and treatment of shoulder complaints.<sup>15</sup> In these guidelines, a classification of shoulder complaints was introduced, based largely on the concepts of Cyriax,<sup>16</sup> that describes four intrinsic shoulder syndromes:

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capsular syndrome, acute bursitis, acromioclavicular syndrome, and subacromial syndrome. We have used this system of classification in an observational study of the incidence and management of intrinsic shoulder disorders in primary health care in the Netherlands. An additional objective was to evaluate which patient characteristics were associated with each specific diagnostic category.

### Patients and methods

Eighteen general practitioners (11 practices), representing a population of 35 150 patients participated in this observational study. Before the study, the general practitioners received extra training on the systematic examination of the cervical spine and shoulder joint, according to the concepts of Cyriax.<sup>16</sup> The clinical guidelines issued by the Dutch College of General Practitioners<sup>15</sup> were used to classify shoulder complaints. Table 1 summarises the clinical guidelines for diagnosis and treatment.

### INCIDENCE OF SHOULDER COMPLAINTS

During a period of 12 months, from April 1993 to April 1994, the general practitioners registered details of all consultations regarding shoulder complaints, including the age and gender of the patients, and the diagnosis. During the registration period the practitioners were asked twice to estimate the percentage of consultations actually registered, in order to assess the number of missed records. Incident cases were defined as those presented by patients who had not consulted their general practitioner for shoulder complaints in the preceding year.

The cumulative incidence of shoulder complaints ( $n/1000/\text{year}$ ) was calculated, including the 95% confidence limits. Age and gender specific incidences were calculated for a limited number of practices, as not every practice could provide sufficient data on the age and gender of their practice population. The cumulative incidence in each general practice was subsequently adjusted for one month of absence (holidays, illness, etc) and for a

percentage of missed records, as estimated by the practitioners themselves (mean proportion of missed records: 20%).

### OBSERVATIONAL STUDY OF INTRINSIC SHOULDER DISORDERS

Patients with an incident complaint were eligible for participation in the observational study. Inclusion criteria for that study were: informed consent; age 18 years or older; ability to complete a written questionnaire; intrinsic shoulder complaints, originating from within the shoulder joint, but no neurological or vascular disorders, neoplasms, referred pain from internal organs, or systemic rheumatic conditions; and no fractures or luxations.

For all participants, their general practitioners recorded data on diagnostic tests and procedures, medication prescribed, injections, referrals, and relevant comorbidity (systemic rheumatic conditions, diabetes mellitus, gastric complaints, ischaemic heart disease, disorders of the gall bladder or thyroid gland, hemiplegia). The participants completed a written questionnaire containing questions on demographic variables, previous complaints, the nature of current complaints, the severity of complaints at night and during the day (11 point ordinal scale: 0 = no complaints... 10 = very severe complaints), and functional disability.

Descriptive statistics were used to present the frequencies of diagnoses, interventions and patient characteristics.

### Results

#### INCIDENCE OF SHOULDER COMPLAINTS (TABLE 2)

During a period of one year the 18 general practitioners recorded 754 consultations concerning shoulder complaints in 472 patients; 392 of the patients presented with an incident complaint. The cumulative incidence of shoulder complaints was calculated as 11.2/1000/year. The incidence varied considerably between practices: from 6.5 to 20.3/1000/year. After adjustment for one month of absence and incomplete registration, the incidence was estimated at 14.7/1000/year (table 2).

Table 1 Summary of clinical guidelines for diagnosis and treatment of shoulder complaints (Dutch College of General Practitioners<sup>15</sup>)

| Syndrome  | Diagnostic criteria   | Guidelines for treatment   |
|---|---|--|
| Capsular syndrome<br>(capsulitis, arthrosis, etc.)  | Restriction of lateral rotation, abduction, and medial rotation.<br>Pain in C5 dermatome.   | 1. NSAIDs or local infiltration of a steroid or anaesthetic<br>2. Passive mobilisation and exercise therapy  |
| Acute bursitis  | Restriction of abduction. Severe pain in C5 dermatome.<br>Acute onset, no evident preceding trauma.   | 1. Local injection of anaesthetic, steroid, or both<br>2. Rest and NSAIDs or analgesics in less severe cases   |
| Acromioclavicular syndrome  | Restriction of horizontal adduction. Pain in the area of the acromioclavicular joint and/or C4 dermatome.   | 1. NSAIDs<br>2. Local injection of an anaesthetic<br>3. Local injection of a steroid (and anaesthetic)<br>4. Physiotherapy   |
| Subacromial syndrome<br>Rotator cuff tendinitis<br>Chronic bursitis<br>Rotator cuff tears | No restriction of passive movement. Pain in the C5 dermatome.<br>Painful arc during elevation. At least one positive resistance test.<br>Bursitis: variable/little pain, normal power<br>Tendinitis: pain, normal power<br>Cuff tears: little pain, loss of power | Bursitis<br>1. Rest/NSAIDs<br>2. Local injection of a steroid and/or anaesthetic<br>Tendinitis<br>1. Rest/NSAIDs<br>2. Physiotherapy<br>3. Local injection of an anaesthetic<br>Cuff tears<br>1. Rest/NSAIDs<br>2. Local injection of an anaesthetic |
| Remainder (unclear clinical picture,<br>fractures, luxations, myalgia, etc)               |   |  |

Table 2 Cumulative incidence of shoulder complaints in 11 general practices (comprising 35 150 registered patients)

|  | Incident cases | Cumulative incidence (n/1000/year) | 95% confidence limits |
|--|----------------|------------------------------------|-----------------------|
| Total unadjusted incidence                         | 392            | 11.2                               | 10.1 to 12.3          |
| Total incidence adjusted for incomplete reporting* | 392            | 14.7                               | 13.4 to 16.0          |
| Gender (unadjusted)†                               |                |                                    |                       |
| Male   | 90             | 8.4                                | 6.7 to 10.2           |
| Female   | 117            | 11.1                               | 9.1 to 13.1           |
| Age categories (years) (unadjusted)‡               |                |                                    |                       |
| <25  | 7              | 1.0                                | 0.3 to 1.7            |
| 25-44  | 77             | 10.2                               | 7.9 to 12.5           |
| 45-64  | 105            | 17.3                               | 14.0 to 20.6          |
| 65-74  | 26             | 12.8                               | 7.9 to 17.7           |
| >75  | 9              | 6.7                                | 2.3 to 11.1           |
| Diagnosis (unadjusted)                             |                |                                    |                       |
| Capsular syndrome                                  | 84             | 2.4                                | 1.9 to 2.9            |
| Acute bursitis                                     | 64             | 1.8                                | 1.4 to 2.2            |
| Acromioclavicular syndrome                         | 18             | 0.5                                | 0.3 to 0.7            |
| Subacromial syndrome‡                              | 174            | 5.0                                | 4.3 to 5.7            |
| Unclear  | 39             | 1.1                                | 0.8 to 1.4            |
| Extrinsic causes                                   | 13             | 0.4                                | 0.2 to 0.6            |

\*The incidence in each practice was adjusted for one month of absence (holidays, illness, etc) and a percentage of missed records, as estimated by the general practitioners themselves.

†Incidence based on a limited number of practices (n = 7) able to provide age and gender specific data on their practice population.

‡Subacromial syndrome: 114 cases of rotator cuff tendinitis (29% of all patients), 45 cases of chronic bursitis (12% of all patients).

The incidence of shoulder complaints was greater for women (11.1/1000/year) than for men (8.4/1000/year) and peaked in the age category 45-64 years (17.3/1000/year). The subacromial syndrome was the disorder diagnosed most frequently, in particular rotator cuff tendinitis (29%).

#### OBSERVATIONAL STUDY OF INTRINSIC SHOULDER DISORDERS

A total of 349 patients were enrolled in the follow up study. There were 43 incident cases that were not included for the following reasons: nine refused to participate, 22 were unable to complete written questionnaires for various reasons, and 12 were suspected of having complaints that were extrinsic in origin. The response rate to the baseline questionnaire was 96% (335 patients). The population comprised 28% housewives, 31% unskilled and lesser skilled labourers, 26% middle and higher educated personnel, and 15% who were students, unemployed, or retired. Comorbidity was recorded for 42 patients (12%). The concomitant diseases most frequently recorded were diabetes mellitus (15), ischaemic heart disease (10), and systemic disorders of the musculoskeletal system (eight; mainly osteoporosis). In addition to their shoulder complaints, 43% of patients reported a painful or stiff neck.

Table 3 presents the age and gender of the patients, with their history of shoulder complaints, and diagnoses. Nearly 50% had experienced shoulder complaints previously (mean number of such episodes: 5.8 (SD 8.8)).

Table 4 presents the information from the patient questionnaires concerning the nature and severity of shoulder complaints. Prevalence of patient characteristics is presented for all patients, and for the most frequently recorded syndromes: capsular syndrome, acute bursitis, tendinitis, and chronic bursitis. There

was little difference between syndromes with respect to gender, or to severity of complaints. The mean severity of complaints was rated somewhat higher during the day than at night (7.2 and 6.3, respectively, on the 11 point ordinal scale).

Other patient characteristics showed some variation between syndromes. A greater proportion of patients with capsular syndrome were aged 45 years or older. The longstanding nature of their complaint (more than one month at presentation) was reported more frequently by patients with capsular syndrome (64%) or chronic bursitis (62%), compared with only 20% of those with acute bursitis. Overuse or strain was a precipitating cause according to a relatively large proportion of patients with subacromial syndrome, particularly rotator cuff tendinitis. Patients with capsular syndrome relatively often reported both pain and stiffness as the predominant complaint (47%). Sleep disturbances were prevalent, particularly in patients with capsular syndrome or acute bursitis. Restriction of movement was a problem in all subgroups, but internal rotation (difficulties reaching to the lower back) was relatively often reported by patients with capsular syndrome (87%).

#### MANAGEMENT BY THE GENERAL PRACTITIONER (FIRST CONSULTATION)

The general practitioners requested few additional diagnostic procedures: seven radiographs (2%) and one laboratory measurement (0.3%). Table 5 presents an analysis of the treatments offered, both to all participants, and separately for the four most frequently diagnosed disorders: capsular syndrome, acute bursitis, tendinitis, and chronic bursitis.

Treatment of shoulder complaints was often initiated with the prescription of medication, mainly non-steroidal anti-inflammatory drugs. Local injection of a steroid, an anaesthetic, or both, was the treatment received by 22% of all participants, most of whom were diagnosed as

Table 3 Gender, history of shoulder complaints, and diagnoses of participants in the observational study (n = 349; mean (SD) age 49.6 (14.4) years). Response rate to the baseline questionnaire: 96% (335 patients)

|   | Number | %  |
|---|--------|----|
| Gender                                      |        |    |
| Male  | 146    | 44 |
| Female                                      | 189    | 56 |
| History of shoulder complaints              |        |    |
| No  | 179    | 54 |
| Yes   | 154    | 46 |
| Treatment of previous complaints (n = 154)* |        |    |
| No treatment                                | 51     | 33 |
| Medication                                  | 27     | 18 |
| Physiotherapy                               | 71     | 46 |
| Injections                                  | 52     | 34 |
| Surgery                                     | 4      | 3  |
| Diagnosis (incident episode)                |        |    |
| Capsular syndrome                           | 75     | 22 |
| Acute bursitis                              | 56     | 17 |
| Acromioclavicular syndrome                  | 14     | 4  |
| Subacromial syndrome‡                       | 159    | 48 |
| Unclear                                     | 31     | 9  |

\*Total frequency may exceed 100%, as more than one treatment modality may have been offered to a patient.

‡Subacromial syndrome: 102 cases of rotator cuff tendinitis (30% of all patients), 42 cases of chronic bursitis (13% of all patients), 15 cases of rotator cuff tears or mixed clinical picture.

Table 4 Patient characteristics of shoulder disorders. Results from the patient questionnaires from all participants in the observational study, and presented separately for capsular syndrome (CS), acute bursitis (AcB), tendinitis (TD), and chronic bursitis (ChrB)

|                                     | All (n = 335)<br>(%) | CS (n = 75)<br>(%) | AcB (n = 56)<br>(%) | TD (n = 102)<br>(%) | ChrB (n = 42)<br>(%) |
|-------------------------------------|----------------------|--------------------|---------------------|---------------------|----------------------|
| Age $\geq$ 45 years                 | 62                   | 91                 | 57                  | 48                  | 74                   |
| Female                              | 56                   | 55                 | 66                  | 57                  | 64                   |
| Duration of symptoms $\geq$ 1 month | 49                   | 64                 | 20                  | 48                  | 62                   |
| Precipitating cause                 |                      |                    |                     |                     |                      |
| Unknown                             | 49                   | 63                 | 66                  | 39                  | 38                   |
| Injury                              | 12                   | 9                  | 2                   | 9                   | 17                   |
| Strain/overuse usual activities     | 18                   | 13                 | 11                  | 27                  | 21                   |
| Strain/overuse unusual activities   | 13                   | 9                  | 13                  | 18                  | 10                   |
| Predominant complaint               |                      |                    |                     |                     |                      |
| Stiffness                           | 11                   | 10                 | 9                   | 9                   | 24                   |
| Both pain and stiffness             | 32                   | 47                 | 29                  | 27                  | 37                   |
| Sleep disturbances                  |                      |                    |                     |                     |                      |
| Unable to lie on afflicted shoulder | 60                   | 73                 | 69                  | 52                  | 51                   |
| Not getting to sleep/waking up      | 81                   | 92                 | 91                  | 75                  | 78                   |
| Severity of complaints*             |                      |                    |                     |                     |                      |
| During the day                      | 67                   | 70                 | 74                  | 68                  | 58                   |
| At night                            | 54                   | 66                 | 60                  | 45                  | 53                   |
| Difficulties reaching to            |                      |                    |                     |                     |                      |
| Back of the head (elevation/abd.)   | 77                   | 81                 | 76                  | 73                  | 85                   |
| Lower back (internal rotation)      | 73                   | 87                 | 75                  | 67                  | 73                   |

\*Scores  $\geq$  7 on an ordinal 11 point scale, ranging from 0 (no complaints) to 10 (very severe complaints).

having acute or chronic bursitis. In our study, physiotherapy seemed to be the preferential treatment for rotator cuff tendinitis.

### Discussion

The cumulative incidence of shoulder complaints in our study was estimated to be 11.2/1000/year, which agrees with the proportion of 12.8/1000/year reported by Miedema.<sup>1</sup> Even after adjustment for incomplete registration (14.7/1000/year), the incidences are lower than those reported by two other Dutch morbidity registrations (25/1000/year<sup>2</sup> and 18–21/1000/year<sup>4</sup>), but higher than estimates from the National Morbidity Surveys in England and Wales (6.6/1000/year<sup>5</sup>). These differences in incidence may be explained by incomplete registration by the general practitioner, differences regarding the definition of an incident episode, or a variation in the proportion of patients reporting a shoulder complaint to their physician. In addition, diagnostic criteria may have varied between studies. The practitioners in our study registered intrinsic disorders only, whereas in other Dutch surveys every complaint concerning the shoulder region was recorded.

The age and gender specific differences demonstrated in our study are in accordance with those revealed by other Dutch and English surveys. The greatest proportions of shoulder complaints are reported during the

fifth to the seventh decades of life,<sup>1 2 5</sup> with a slight majority of female patients (57–59%).<sup>1 2</sup> The incidence seems to level off or even decline in the older age categories. However, some community surveys have reported a high prevalence of chronic shoulder conditions in the elderly,<sup>8 9 14</sup> suggesting that many elderly do not seek medical attention for a persisting painful or stiff shoulder.

Rotator cuff tendinitis (29% of all incident cases) was the diagnosis most frequently recorded, as was reported also by Chard *et al.*<sup>9</sup> Comparison of our data with those in other reports is made difficult by the scarcity of data, and the fact that those available are based predominantly on hospital surveys. The study of shoulder disorders is particularly complicated because of the lack of consensus regarding the diagnostic criteria of specific shoulder disorders. The ideas of Cyriax on the diagnosis and treatment of shoulder disorders have been applauded, but also severely criticised.<sup>17 18</sup> Several authors have proposed alternative classification systems.<sup>19–23</sup>

The importance of a case history in the assessment of shoulder complaints has been demonstrated by Gärtner *et al.*<sup>24</sup> In a prospective study of 65 patients, shoulder complaints were classified into 24 diagnostic categories on the basis of a detailed case history alone. More than 50% of the diagnoses were in agreement with later findings of arthrography, surgery, etc. In our study, patient characteristics showed some variation between specific diagnostic categories, in particular with respect to age, duration of symptoms, precipitating cause, and restriction of movement. The variations, though small, seem to be compatible with the clinical features described by Cyriax<sup>16</sup> and other authors of frequently cited papers on shoulder disorders. For example, our clinical picture of capsular syndrome agreed with the description of adhesive capsulitis by Murnaghan.<sup>25</sup> patients are often unable to sleep on the affected shoulder, there is functional restriction of

Table 5 Treatment by the general practitioner\*. First consultation for shoulder complaints by participants in the observational study

| Diagnosis              | Wait and see<br>(%) | Medication<br>(%) | Physiotherapy<br>(%) | Injection†<br>(%) |
|------------------------|---------------------|-------------------|----------------------|-------------------|
| All patients (349)     | 28                  | 38                | 30                   | 22                |
| Capsular syndrome (76) | 20                  | 47                | 20                   | 30                |
| Acute bursitis (60)    | 27                  | 43                | 3                    | 47                |
| Tendinitis (106)       | 27                  | 32                | 53                   | 5                 |
| Chronic bursitis (42)  | 38                  | 26                | 17                   | 38                |

\*Total frequency may exceed 100%, as more than one treatment modality may have been offered to a patient.

†Local infiltration with steroid, anaesthetic, or both.

motion, often no precipitating event can be recalled, and occurrence is predominant during the fifth to the seventh decades of life. However, it must be noted that a description of shoulder syndromes was included in the training that preceded our study. A case history of the participants is likely to have been part of the assessment of complaints by the general practitioners, and will have influenced their diagnoses. Consequently, there was probably some cross contamination of data; those from the patient questionnaires were, to a certain extent, similar to the information available to the general practitioner. What our results do represent is the distribution, in a consecutive group of primary care patients, of the Cyriax shoulder syndromes as diagnosed by a group of general practitioners trained in this method of classification.

As yet, there are no diagnostic tests or procedures which provide decisive evidence as to the pathology of shoulder complaints. Imaging techniques can be very useful for detecting rotator cuff tears, but are often of little help in diagnosing other soft tissue disorders.<sup>26 27</sup> In our study, laboratory tests or radiographs were requested only infrequently, but this may be distorted by the fact that patients with complaints of suspected extrinsic origin were excluded from the follow up study; additional diagnostic procedures may have been used more frequently for those patients. In other Dutch surveys, radiographs were requested in approximately 8% of all cases, and laboratory measurements in 1–2%.<sup>1 2</sup> For most patients, however, a detailed case history and clinical examination appear to be sufficient to permit a decision on management and prognosis.

A classification of shoulder complaints would be particularly useful if it implied consequences for treatment. The clinical guidelines recently introduced by the Dutch College of General Practitioners contain tentative directives for treatment for each specific diagnostic category (table 1). Our results indicate that, in general, treatment for shoulder complaints was initiated according to these guidelines, although considerable variation of methods was noted between practitioners. Treatment was, to some extent, similar to that recorded in other Dutch surveys, in which 20%<sup>2</sup> to 33%<sup>1</sup> of the patients were referred for physiotherapy, and medication was prescribed in 43%<sup>2</sup> to 50%.<sup>1</sup> However, injections were given more frequently in our sample: to 22% of the patients, compared with 1%<sup>2</sup> and 13%.<sup>1</sup> The majority of our participating general practitioners had received extra training in the use of steroid injections. Other classifications of shoulder disorders may imply other directives for treatment.<sup>19 20 28 29</sup> Recent systematic reviews have indicated that conclusive evidence on the efficacy of non-steroidal anti-inflammatory drugs,<sup>30</sup> physiotherapy,<sup>31</sup> or steroid injections (Van der Heijden *et al.*, in preparation) for shoulder disorders is still lacking.

The concepts of Cyriax are accepted by a considerable number of physiotherapists and

physicians, but have seldom been subjected to further scrutiny. Future research should demonstrate whether the proposed shoulder syndromes really constitute separate disorders with differing underlying pathology. The results of our continuing observational study will provide information on the prognosis of the shoulder syndromes, as all participants will receive follow up questionnaires at fixed intervals during a period of one year. The next questions to be answered relate to whether the choice of treatment should depend on diagnosis: which intervention is most effective for capsular syndrome, are injections indeed the preferential treatment for bursitis, and is physiotherapy the best option for rotator cuff tendinitis?

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