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# Musculoskeletal disorders in children: a study in Dutch general practice

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**Objective** – This study focuses on the occurrence of musculoskeletal disorders in children presented in general practice. Known epidemiological studies addressing musculoskeletal diseases in childhood are scarce and based on a low number of episodes.

**Design and setting** – Prospective study of all patient contacts in general practice. A total number of 161 general practitioners participated, divided into four groups, registering during four consecutive three-month periods.

**Patients** – All children younger than 15 years of age who visited their GP during the registration period. All diagnoses and working hypotheses concerning musculoskeletal disorders were selected.

**Results** – The total number of children in the study was 64 198. Disorders of the musculoskeletal system accounted for 3 699 (7.5%) of all 49 309 contacts and for 3 046 (7.5%) of all 40 340 episodes. Of the 3 046 episodes registered for ICPC-chapter L (musculoskeletal), 2 562 (84%) were new episodes, i.e. not presented to the GP before.

Fifty-four percent of all new episodes were acute injuries. In 22% of the new episodes the general practitioner made a symptom diagnosis. Differences by age and sex were found for a limited number of diagnosis categories.

**Conclusion** – Children present disorders of the musculoskeletal system less often than adults; they also present different disorders to their general practitioners. The majority of disorders presented by children are acute injuries, mostly sprains and strains.

**Key words:** children, musculoskeletal disorders, general practice, The Netherlands.

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Musculoskeletal disorders in childhood are either congenital in origin or subsequently acquired (1). The acquired disorders can be subdivided in traumatic and non-traumatic disorders. Within the

group of traumatic disorders we distinguish acute and overuse injuries. Infections, tumours, and acquired deformities are examples of acquired non-traumatic disorders.

The aim of this study was to gain insight into the occurrence of musculoskeletal disorders in children presented in Dutch general practice.

Several studies show that both the occurrence of and medical consumption for musculoskeletal disorders are high. The Danish Health and Morbidity Survey of 1986-87 demonstrates a high prevalence of musculoskeletal disorders in the population over 15 years of age (2). The Dutch general practitioner (GP) is confronted with musculoskeletal disorders frequently (3). Lamberts (4) reports that musculoskeletal disorders account for 15% of all episodes (all ages). A Finnish study shows a higher increase in hospital admissions and outpatient consultations for musculoskeletal disorders (including trauma) than for other conditions during the period from 1970 to 1985 (5).

Studies of musculoskeletal morbidity in children are usually restricted to specific disorders (1,6). Data relating to the total morbidity of musculoskeletal diseases in childhood are scarce and based on a relatively low number of episodes (4,7).

In this study we address three questions:

- (1) which musculoskeletal disorders do children present in general practice?
- (2) what is their part in the total morbidity in children?
- (3) are there age and/or sex specific differences?

## Patients and methods

From 1 April 1987 to 31 March 1988, the Dutch National Survey of Morbidity and Interventions in General Practice was performed by the NIVEL (Netherlands Institute of Primary Health Care) (8). For this survey 103 general practices (161 GPs) recorded all contacts with patients during one of the four consecutive periods of three months (contact registration). Data were registered for each contact concerning reason(s) for the consultation, working hypothesis, and differential diagnosis. The reason(s) given for the consultation and the differential diagnosis were written down literally by the GP and subsequently coded by a medically trained clerk of the NIVEL using the International Classification of Primary Care (ICPC). The version used by NIVEL (9) differs slightly from the original classification (10). With respect to chapter L (musculoskeletal disorders)

the NIVEL version of the ICPC contains more diagnosis codes. In the original ICPC, diagnoses are often clustered into one diagnosis code whereas the NIVEL version allows extra scores for separate diagnoses. For example the original version has only one code for congenital disorders (L 82), where the modified version has separate codes for congenital dislocation of the hip (L 82.1) and other congenital disorders (L 82.9). Another important difference is that in the NIVEL version a diagnosis code can be assigned to a particular joint/part of the musculoskeletal system. This enabled us to discriminate a distortion/contusion at the shoulder (L 79.1) from one at the wrist (L 79.2).

This National Survey includes an episode-oriented registration of morbidity. Census data, such as birth date and sex, were recorded for the whole population under study (patient registration).

For our study we have used the data of all children younger than 15 years of age in the National Survey. All diagnosis codes within the ICPC-chapter L (musculoskeletal disorders) were grouped into eight diagnostic categories (Table I). The diagnostic category Other Diagnoses contains a heterogeneous group of diagnoses that cannot be classified elsewhere. We distinguished a separate diagnostic category Symptom Diagnoses for the symptom codes. In making such a diagnosis the GP confines himself to describing the symptom, not further defining the underlying disorder.

First, all contacts were classified into the various diagnostic categories. Next we studied new episodes of illness. A new episode was defined as an episode of which the first contact took place within the registration period. In order to assign the new episodes into the various diagnostic categories we used the diagnosis or working hypothesis of the last registered contact of the episode (episode diagnosis). We calculated incidence rates dividing the number of new episodes by the time the children were followed. Because of the heterogeneity we did not calculate incidence rates for the diagnostic categories Other Diagnoses and Symptom Diagnoses.

For the Congenital Disorders and Congenital Hip Dislocation we determined the prevalence for infants under the age of one year and the sex distribution.

Table I. Diagnostic categories ICPC-chapter L

DIAGNOSTIC CATEGORY	DIAGNOSES
Acute Injuries	sprains/strains, whiplash of calf muscles, fractures, dislocations and (sub)luxations
Overuse Injuries	shoulder syndromes, bursitis, tendinitis, synovitis, chronic knee problems and osteochondroses
Infections	Bornholm disease, osteomyelitis, osteitis, abscess and infections NEC*
Tumours	benign, malign, not further specified
Acquired Deformities	spine deformities, flat feet, hallux valgus, genua vara or vara and limbs NEC*
Other Diagnoses	arthrosis, osteoporosis, low back pain with radiating symptoms, ganglion, rheumatoid arthritis and allied conditions, musculoskeletal syndromes and diseases NEC*
Symptom Diagnoses	symptoms/complaints of musculoskeletal system not further specified, including muscle pain, fear of cancer and disability.

\* NEC not elsewhere classified

## Results

The number of children under the age of 15 in the Dutch National Survey amounted to 64 198. Of these children 27 462 had a total of 49 309 contacts with their GPs during the registration period. Disorders of the musculoskeletal system accounted for 3 699 of these contacts (7.5%).

Table II shows the number of episodes for the various ICPC-chapters. Disorders of the musculoskeletal system accounted for 3 046 (7.5%) of all 40 340 registered episodes.

Of the 3 046 episodes registered for ICPC-chapter L (musculoskeletal) 2 562 were new episodes (84%). On average a new episode consisted of 1.2 contacts. Table III lists the number of new episodes and the calculated incidence rates for the diagnostic categories of the musculoskeletal disorders. For acute injuries 1 392 new episodes (54.3% of all new episodes) were registered. In

Table II. Top 10 ICPC-chapters (episodes)

ICPC-chapter	n	%
R - respiratory	10930	27.1
A - general	7286	18.0
S - skin	6689	16.6
D - digestive	3465	8.6
H - hearing	3441	8.5
L - musculoskeletal	3046	7.5
F - eye	1477	3.7
P - psychological	645	1.9
U - urology	771	1.6
N - neurological	573	1.4

Table III. Incidence rates per diagnostic category of musculoskeletal disorders in children (per 1000 person-years)

DIAGNOSTIC CATEGORY	Number	%	Incidence rate
Acute Injuries	1392	54.3	82.0
Symptom Diagnoses	558	21.7	-
Overuse Injuries	205	8.0	12.7
Acquired Deformities	202	7.9	12.7
Other Diagnoses	133	5.3	-
Congenital Disorders	59	2.3	0.1*
Infections	10	0.4	0.6
Tumours	3	0.1	0.1
TOTAL	2562	100.0	

\* prevalence (%)

558 new episodes (22%) the GP made a symptom diagnosis.

The 15 diagnosis codes with the highest incidence rate are listed in Table IV. These codes accounted for 1 681 of all 2 562 new episodes (66%). Of these 15 diagnosis codes, nine concerned acute injuries, three acquired deformities, two symptom diagnoses, and one overuse injury.

The age and sex specific incidence rates for Acute Injuries are shown in Figure 1. We calculated an incidence rate of 77.6 per 1 000 person years for boys, 87.1 per 1 000 person years for girls, and 82.0 per 1 000 person years for the total group. The age and sex specific incidence rates for Overuse Injuries and Acquired Deformities are shown in Figures 2 and 3, respectively. The incidence rates of Overuse Injuries for boys and

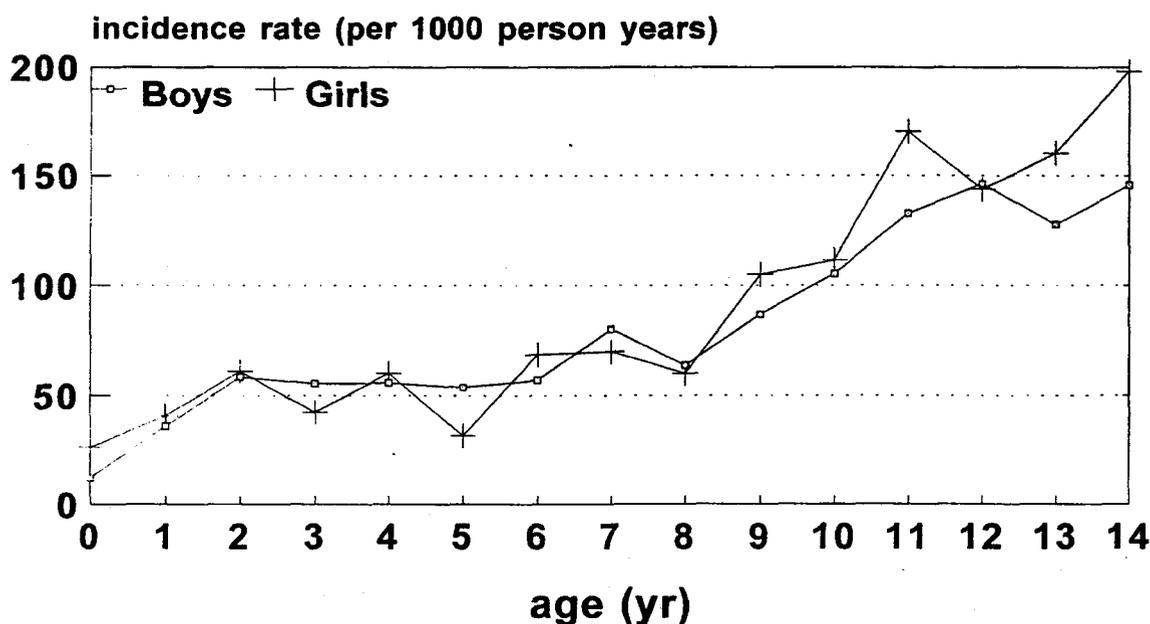


Figure 1. Age-specific incidence for acute injuries (n = 1392)

Table IV. Top 15 of incidence rates for separate diagnosis codes (per 1 000 person-years)

DIAGNOSIS (ICPC-CODE)	Episodes	Incidence rate
Sprain/strain wrist/hand/finger (L29.2)	276	17.5
Sprain/strain ankle (L77)	203	12.9
Sprain/strain foot/toe (L79.3)	193	12.2
Myalgia/muscle cramps (L18)	187	11.7
Sprain/strain musculoskeletal system NEC (L79.9)	157	9.9
Sprain/strain knee (L78)	124	7.9
Sprain/strain shoulder/arm/elbow (L79.1)	108	6.8
Tendinitis/synovitis (L93.9)	84	5.3
Disability/impairment (L28)	67	4.2
Flat feet (L98.1)	64	4.1
Fracture radius/ulna (L72)	62	3.9
Fracture (meta)carpal/(meta)tarsal bone (L74)	59	3.7
Acquired deformities limbs (L98.9)	56	3.5
Fracture NEC (L76.9)	51	3.2
Acquired deformities spine (L85)	45	2.9

girls were both 12.8 per 1 000 person years. The incidence rates of Acquired Deformities were 12.3 per 1 000 person years for boys, 13.3 per

1 000 person years for girls, and 12.7 per 1 000 person years for the total group.

There were 59 (new) episodes registered for Congenital Disorders, of which 33 (56%) referred to Congenital Hip Dislocation. In 29 cases the child was under one year of age. We calculated a prevalence of 0.7% for children under one year of age (4 451 children were under one year of age). The sex distribution within this group was 12 boys and 17 girls.

## Discussion

The incidence and prevalence rates we calculated are based on data collected in general practice and not on the whole population. Hence, our data give an insight into the musculoskeletal disorders that children present to their GP. Considering the iceberg of illness (11), and due to the fact that after a trauma Dutch patients go to hospital directly, we expect the calculated incidence rates to be underestimations of the occurrence in the population.

This study indicates that, compared with adults, musculoskeletal disorders account for a smaller proportion of total morbidity in children.

In about one in every five consultations and

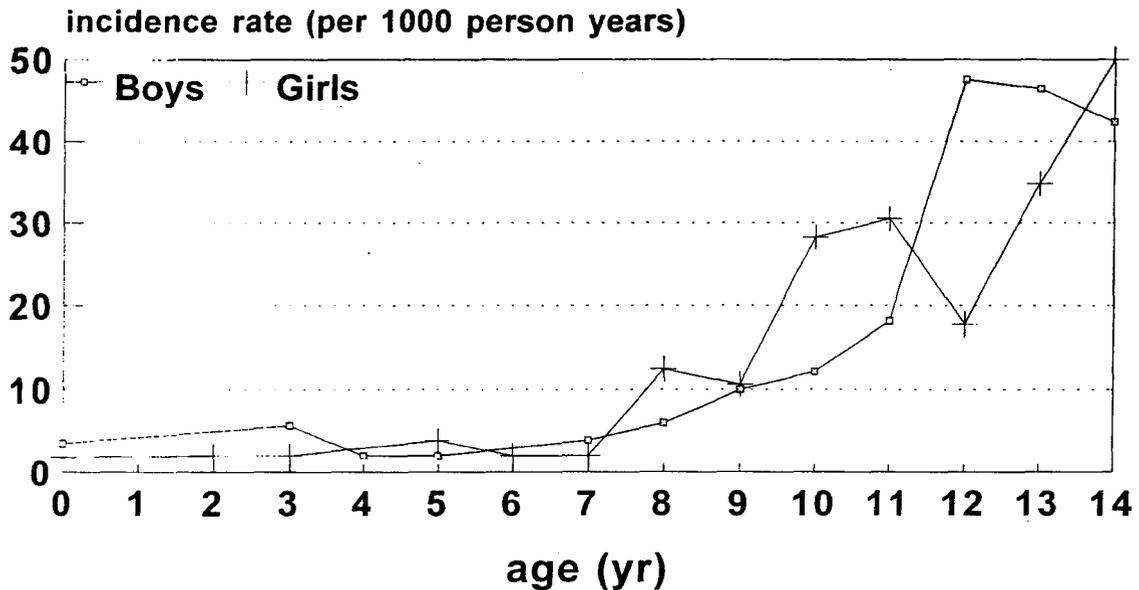


Figure 2. Age-specific incidence of overuse injuries (n = 205)

episodes concerning a musculoskeletal problem the GP confines himself to a symptom diagnosis. We think, as proposed by Lamberts (4), that this relatively high percentage is the result of the low specificity of musculoskeletal symptoms.

Since the numbers are small our findings concerning tumours and infections of the musculoskeletal system must be interpreted carefully. It is also important to realize that a GP can only suspect such a diagnosis. Nevertheless our data show that a GP rarely sees a child with a tumour or an infection of the musculoskeletal system.

Of all musculoskeletal disorders, the GP is confronted mostly with sprains and strains in children. Sprains/strains of the wrist/hand/finger have the highest incidence rate, followed by sprains/strains of the ankle. The latter is the form most frequently seen in adults (3,4). As in the study of Landin (12) we found that fracture of the forearm is the fracture most often seen in children. Since acute injuries usually result from accidents it is not surprising that the age distribution resembles the age distribution for accidents in children (13,14). The higher incidence rate in our study for acute injuries in girls is remarkable since accidents occur more often in boys (13). The fact that we limited ourselves to acute injuries of the mus-

culoskeletal system and did not take all accidents into account may explain the sexdifference.

In this study overuse injuries were rarely seen in children under the age of eight years, but above this age their occurrence increased rapidly. Like Kannus et al. (15) we did not find a sexdifference for this age group. Other studies state that boys are more active at sports than girls (16,17). The equal sex incidence rates for overuse injuries in boys and girls may result from a greater vulnerability in girls for these kinds of injury (15,17).

Of all congenital disorders, the GP most often sees congenital dislocation of the hip. The prevalence in children under the age of one year in our study was lower than that found in other Dutch studies (18,19). This probably results from the fact that the GP does not see the children in whom the congenital hip dislocation is detected directly after birth in the hospital. These studies also demonstrate a female preponderance for dislocation of the hip.

Not only do children present disorders of the musculoskeletal system less often than adults, they also present different disorders to their GP. The majority of musculoskeletal disorders presented by children are acute injuries, mostly sprains and strains.



Figure 3. Age-specific incidence for acquired deformities (n = 202)

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## The 3rd European Congress on family Medicine/General Practice, WONCA 30 June - 4 July 1996,

Welcome to the 3rd European Congress on Family Medicine/General Practice which will take place in Stockholm, Sweden from Sunday June 30 to Thursday July 4 at the Stockholm City Conference Centre, Barnhusgatan 14, in the heart of Stockholm. *Carl Edvard Rudebeck* President and Chairman of the Scientific Committee of the Congress Invitation Programme with call for abstracts will be distributed during fall 1995. Please contact the congress secretariat if you would like to received it. Congress secretariat: 3rd Wonca 1996, Stockholm Convention Bureau, Box 6911, Stockholm, Sweden. Telephone: + 46 8 736 15 00 Telefax: + 46 8 34 84 41.

### Scientific Programme

Main congress theme: Continuing medical education (CME) in general practice/family medicine in Europe. The individual general practitioner/family physician has to take responsibility for her/his own professional development. This is a major tendency throughout Europe and systems are created to promote individual learning. It is essential that learning needs be identified. learner-oriented teaching models developed and critical reflection supported. Also by highlighting the practice and learning of the individual practitioner. intergration may be achieved between CME and quality assurance. Research has a key position in relation to both CME and quality assurance. as it combines the production and critical assessment of clinical knowledge and strategies.

### Additional themes:

#### **The individual in clinical practice**

By way of her/his expert skills and knowledge, the general practitioner/family physician may, in the consultation, mediate between the individual experience of the patient and the categories of biomedicine.

#### **Medical topics of interest to the general practitioner/family physician**

Diagnosis and treatment of common diseases always have high priority in general practice/family medicine. In addition, reforms of the health care systems give the general practitioners/family physicians new responsibilities in the broad areas of medicine.

#### **The general practitioner/family physician and the human sciences**

To be able to meet the patient in the complexity of her human condition, the general practitioners/family physician needs support from fields of knowledge such as philosophy, antropology and psychology.

#### **General framework of the congress**

The Stockholm congress will offer a learning experience and, at the same time, provide an exposé of CME programmes and ideas. Learner- and process-oriented sessions will mix with lectures and symposia. Practitioners, researchers and teachers of general/family practice will be invited to contribute to the sessions for posters and free-standing papers.