

# Musculoskeletal Pain in Primary Pediatric Care: Analysis of 1000 Consecutive General Pediatric Clinic Visits

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**ABSTRACT.** *Objectives.* 1) To determine the number of primary care clinic visits attributable to musculoskeletal pain (MSP) in children  $\geq 3$  and  $< 15$  years of age. 2) To describe the demographic characteristics of this population assessed for limb/back pain. 3) To characterize the etiology of musculoskeletal pain in an urban general pediatric clinic in Madrid, Spain.

*Methods.* Prospective evaluation of 1000 consecutive clinic visits to an urban general pediatric clinic. Inclusion criteria were 1) age  $\geq 3$  and  $< 15$  years and 2) musculoskeletal evaluation requested by the family or patient. All consultations related to MSP were recorded via standard protocol and data record form.

*Results.* During the study period, 61 of 1000 (6.1%; confidence interval: 4.6–7.5) clinic visits for children  $\geq 3$  and  $< 15$  years were related to MSP. Patients' age, mean  $\pm$  SD, was  $9.7 \pm 3.3$  years. Musculoskeletal complaints were more frequent in boys (57.4%), although there was no statistical difference. The presenting complaints included knee arthralgias in 33%; other joint (eg, ankles, wrists, elbows) arthralgias in 28%; soft tissue pain in 18%; heel pain in 8%; hip pain in 6%; and back pain in 6%. Symptoms were attributable to trauma in 30%; overuse syndromes in 28% (eg, chondromalacia patellae, mechanical plantar fasciitis, overuse muscle pain); and normal skeletal growth variants (eg, Osgood-Schlatter syndrome, hypermobility, Sever's disease) in 18% of patients.

*Conclusion.* MSP represents a frequent presenting complaint in general pediatric practice. A new heightened awareness of the frequent occurrence of MSP should be adopted when designing pediatrics continuing medical education and training programs. *Pediatrics* 1998;102(6). URL: <http://www.pediatrics.org/cgi/content/full/102/6/e63>; musculoskeletal pain, limb pain, arthralgia, children, general pediatrics, pediatric primary care.

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ABBREVIATIONS. MSP, musculoskeletal pain; NHS, National Health Service; MECH, mechanical/overuse; TRAU, trauma; NVAR, normal skeletal growth variants; NS, nonspecific (pain); GP, growing pains; VIR, viral infection; TS, transient synovitis; CI, confidence interval.

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Musculoskeletal pain (MSP) is a frequent complaint in childhood, affecting 7% to 15% of school children.<sup>1-4</sup> Limb or back pain are extremely uncommon in children younger than 3 years, increasing its frequency with age until reaching a plateau during early adolescence. Despite the

high prevalence of MSP in pediatrics, to date no study has focused on the number of general pediatric clinic visits attributable to this complaint. This observation might be explained by the profile of pediatric practice recorded in the United States and some European countries,<sup>5-8</sup> where  $>70\%$  of the visits were a result of healthy-child/adolescent check-ups; upper respiratory or ear, nose and throat infections; gastroenteritis; and skin diseases. Although musculoskeletal complaints represent a low percentage of clinic visits, experience indicates that they usually carry a significant economic burden because of the diagnostic procedures performed (such as complete blood count, erythrocyte sedimentation rate, streptococcal serology, radiography) or referral to other health care providers (orthopedic surgeons, rheumatologists).

This study was undertaken to determine the number of general pediatric clinic visits attributable to MSP in children and adolescents 3 to 14 years old and to describe their demographic characteristics and the diagnosis reached.

## PATIENTS AND METHODS

The study was performed prospectively, recording all clinic visits to an urban National Health Service (NHS) general pediatric clinic located in Madrid, Spain. The study period was 4½ months, from October 30, 1996, to March 17, 1997. Inclusion criteria were 1) age between 3 and 14 years and 2) musculoskeletal evaluation because of pain requested by the family or the patient. Children who received routine pediatric care at the clinic but who were initially evaluated for MSP elsewhere (eg, in the emergency room) were not included in the study.

The Spanish health care system, including pediatric care, is offered to families free of charge in clinics located no more than 30 minutes from family residences. To facilitate access of care, parents can choose among pediatricians working morning/afternoon (8 AM to 3 PM) or afternoon/evening (2 PM to 9 PM) schedules. Routine pediatric care at these clinics is received by 80% to 90% of all children. Unlike those in the United States, families living in urban areas of Spain have a higher socioeconomic status than do suburban populations.

Patient assignment to clinics is based on residential geographic location. At the urban general clinic, 859 children are followed routinely, having a nearly equal boy:girl distribution (50.2% to 49.8%). Of the clinic population, 80% were age-eligible for this study. The mean  $\pm$  SD and median age of patients 3 to 14 years old were  $8.6 \pm 3.2$  and 8.5 years, respectively.

To record accurately the number of consultations related to limb or back pain, the visits were classified as either primary (defined as visits for children who attended the clinic for evaluation of MSP) or secondary (defined as visits for children who attended the clinic for other reasons, usually check-ups, but for whom parents requested musculoskeletal evaluation for MSP during the visit). Both type of visits were included in these study results.

Data were recorded via standard protocol and data record form. Only unduplicated visits were included in the study. The

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**TABLE 1.** Presenting Complaints and Etiology of MSP According to the Type of Visit and Summary of Presenting Complaints and Etiologic Categories Recorded in the Series

	Primary	Secondary	Total (%)
Mean age (SD)	9.9 (3.0)	9.3 (3.8)	
Number of patients (%)	42 (68.9)	19 (31.1)	61
Boy/girl	22:20	13:6	
Presenting complaint			
Knee arthralgias	8	12	20 (32.8)
Arthralgias (other)	14	3	17 (28)
Soft tissue pain	9	2	11 (18)
Heel pain	4	1	5 (8.2)
Hip pain	3	1	4 (6.5)
Back pain	4	0	4 (6.5)
Etiology			
Trauma (TRAU)	17	1	18 (29.5)
Mechanical/overuse (MECH)	12	5	17 (27.9)
Normal variants (NVAR)	5	6	11 (18)
NS	5	2	7 (11.5)
GP	2	3	5 (8.2)
VIR	0	2	2 (3.3)
TS	1	0	1 (1.6)

protocol included patient demographic data; significant antecedents (infectious, traumatic); date of onset of symptoms; pain location; frequency of MSP (daily, weekly, monthly); pain pattern (inflammatory [pain worsened by rest and/or associated with morning stiffness] or mechanical [MECH; pain worsened by exercise, which often is more intense in the evening]); complete general and musculoskeletal examinations; and follow-up data. All examinations were performed by one American board-certified pediatric rheumatologist (JDI).

Presenting complaints were classified into six groups (Table 1): knee arthralgias; other joints (eg, ankles, wrists, elbows) arthralgias; soft tissue (muscles, ligaments, tendons) pain; and heel, hip,

and back pain. Etiologic categories included seven groups: trauma (TRAU; sprains, muscle contusions, traumatic arthritis, bone fissures); MECH pathology (chondromalacia patellae, mechanical plantar fasciitis, overuse tenosynovitis, muscle pain); normal skeletal growth variants (NVAR; Osgood-Schlatter syndrome, Sever's disease, hypermobility); nonspecific pain (NS; self-limited pain with normal musculoskeletal examination results); growing pains (GP), arthralgias, and/or myalgias associated with viral infection (VIR); and transient synovitis (TS) (Table 1).

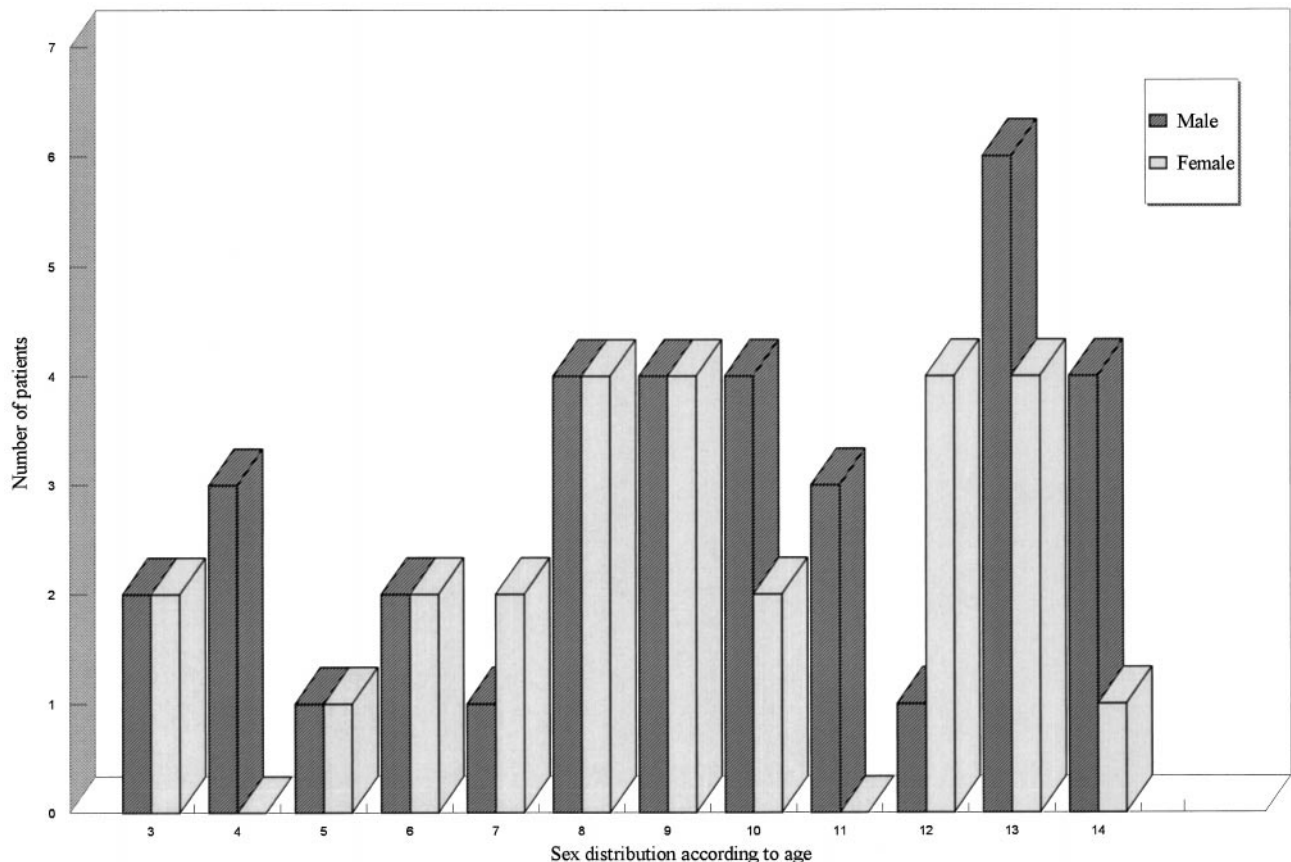
### Statistical Methods

The descriptive values of variables were expressed as mean, SD, percentages, median, and ranges. Comparisons between groups were calculated using the two-tailed Mann-Whitney *U* test. The  $\chi^2$  test was used to compare categorical data. Statistical significance was set at 0.05 for all tests performed, and 95% confidence intervals (CIs) were used in all cases when reported. All calculations were performed using the statistical package SigmaStat for Windows 1.0 (Jandel Corporation, San Rafael, CA).

### RESULTS

During the 4½-month study period, 61 of 1000 (6.1%; CI: 4.6–7.5%) clinic visits were attributable to MSP. Patients' mean age  $\pm$  SD was 9.7  $\pm$  3.3 years (range, 3 to 14.9 years). The sex distribution revealed no significant differences (57.4% boys vs 42.6% girls). Two thirds (40/61) of the children were between 8 and 13 years of age. Figure 1 represents the number of study patients evaluated according to age and sex.

Almost 70% (42/61) of visits were primary MSP consultations. The remaining 30% were secondary MSP evaluations, based on parental request for MSP evaluation while seen in clinic for other reasons. The



**Fig 1.** Distribution, by sex and age, of the 61 patients with MSP seen in the clinic.

**TABLE 2.** Distribution of Diagnoses According to the Presenting Complaint and Type of Consultation

Presenting Complaint	Type of Consultation	Etiology (Group)
Knee arthralgias ( <i>n</i> = 20; 32.8%)	Primary, 8	Chondromalacia patellae (MECH), 5 Osgood-Schlatter syndrome (NVAR), 2 Hypermobility (NVAR), 1
	Secondary, 12	Chondromalacia patellae (MECH), 4 Overuse (MECH), 1 Osgood-Schlatter syndrome (NVAR), 4 GP, 2 VIR, 1
Arthralgias (other) ( <i>n</i> = 17; 28%)	Primary, 14	Contusion (TRAU), 12 NS, 2
	Secondary, 3	Contusion (TRAU), 1 NS, 1 VIR, 1
Soft tissue pain ( <i>n</i> = 11; 18%)	Primary, 9	Contusion (TRAU), 5 GP, 2 Postexercise myalgias (MECH), 1 NS, 1
	Secondary, 2	GP, 1 Hypermobility (NVAR), 1
Heel pain ( <i>n</i> = 5; 8.2%)	Primary, 4	Mechanical plantar fasciitis (MECH), 2 Sever's disease (NVAR), 2
Hip pain ( <i>n</i> = 4; 6.5%)	Secondary, 1	Sever's disease (NVAR), 1
	Primary, 3	NS, 2 TS, 1
Back pain ( <i>n</i> = 4; 6.5%)	Secondary, 1	NS, 1
	Primary, 4	Muscle overuse (MECH), 4
	Secondary, 0	

duration of symptoms was highly variable, with a mean of 56 days for the primary consultations and 167 days for the secondary consultations ( $P = .02$ ).

Knee arthralgias, identified in 32.8%, were the complaints most commonly presented. Arthralgias in other joints comprised 28% of presenting complaints, and soft tissue pain was reported in 18%. These three groups combined represented close to 80% of all MSP consultations (Table 1). Much less frequent were heel, hip, or back pain, with frequencies ranging between 6% and 8%.

The two leading etiologies, TRAU and MECH pathology, occurred with similar frequency and together represented 58% of all study participants. NVAR and NS pain combined comprised 30% of MSP etiologies. The remaining 12% of MSP etiologies were attributable to GP (8%), myalgias associated with VIR (3%), and TS (1%) (Table 1).

Table 2 lists the etiology of MSP in the patients evaluated according to the type of visit and presenting complaint.

## DISCUSSION

This study demonstrates that MSP was a frequent presenting complaint in general pediatrics, involving 6.1% of all clinic visits in children and adolescents 3 to 14 years of age. Taking into account that previous reports have shown that up to 70% of all pediatric clinic visits are a result of routine care (healthy-child/adolescent check-ups; upper respiratory or ear, nose, and throat infections; gastroenteritis; skin diseases),<sup>5-8</sup> having demonstrated a frequency of 6.1% for MSP in the remaining 30% nonroutine visits is of significance.

The classification of clinic visits as either primary or secondary proved useful, because including only primary visits would have resulted in underreport-

ing one third of patients presenting as secondary MSP visits. The number of primary and secondary visits, however, may differ in another medical setting. A less-accessible health system than the Spanish NHS probably would report a decreased total number of benign and transient MSP consultations. Health care systems with less emphasis on preventive activities probably would report increased numbers of primary visits. This view is supported by the statistically significant longer duration of symptoms in secondary (mean, 5.6 months) than in primary (mean, 1.9 months) consultative groups, despite similar diagnoses. This apparent paradox could be explained by the lower pain intensity and/or frequency of pain symptoms reported at secondary visits, which could result in delayed consultation by families until the next scheduled healthy-child/adolescent check-up.

The frequency of pediatric MSP was similar in boys and girls. Musculoskeletal complaints were more common in children between 8 and 13 years of age (Fig 1). The decrease seen after 13 years of age was most likely attributable to the organization of the Spanish NHS, which requires transfer of patient care from the pediatrician to the family physician at age 14. A significant number of families, however, do not meet this requirement until the child's 15th birthday.

Knee arthralgias, arthralgias in other joints, and soft tissue pain combined represented close to 80% of all MSP consultations (Table 1). Therefore, in most patients, MSP symptoms were identified in large joints or muscles, tissues that are easily accessible and easy to assess by any pediatrician with basic training in musculoskeletal examination.

Of all MSP consultations, 90% fell into four etiologic categories (Table 1). TRAU and MECH pathol-



ogy had similar frequencies and together represented 60% of the etiologies. Two other categories, NVAR and NS pain, comprised another 30% of the etiologies. Therefore, the etiology of MSP in the patients evaluated usually was benign.

A positive trend was observed between the etiology of MSP and the age of children. Most school children complained of arthralgias and soft tissue pain related to hypermobility, GP, and playground-related contusions, whereas preadolescents and adolescents presented more frequently MECH pathology, sport-related TRAU, or NVAR (data not shown).

The absence of serious bone fractures and low frequency of TS in this series could be explained by the fact that most primary care clinics in Spain are not equipped with radiologic equipment. In addition, families are aware that pediatricians and pediatric orthopedic surgeons are available 24 hours a day at the emergency room of pediatric hospitals, where radiologic and laboratory equipment are readily available and are provided free of charge. For these two reasons, after significant TRAU or acute development of limp, families request initial evaluation in the emergency room. Children evaluated for MSP in the emergency room, however, were not included in the study. This limitation suggests that the study probably underestimates the actual frequency of these complaints.

None of the children evaluated for soft tissue pain met fibromyalgia syndrome criteria. In addition, no cases of "idiopathic diffuse MSP syndrome" were identified in this cohort of patients. This syndrome is characterized by chronic, incapacitating pain of non-organic etiology.<sup>9-11</sup> This observation may be explained by the different setting where the syndrome has been reported (tertiary hospitals).

Despite the influence of health care organization on the pattern of use of primary care clinics, the results obtained in this study are similar to those recorded by other series. The National Ambulatory Medical Care Survey performed in the United States in 1977-1978 revealed that 7% of the pediatric visits were attributable to MSP.<sup>1</sup> Other surveys performed among school children in Denmark, England, and North America concluded that ~15% of the children had episodes of MSP that were particularly severe or persistent in 3% to 4.2% of the population surveyed.<sup>2-4</sup> Although neither of those studies evaluated the number of pediatric clinic visits attributable to this complaint, it could be expected that a higher percentage of those with severe, persistent pain would consult their pediatricians directly.

In summary, MSP is a prevalent complaint in pe-

diatric primary care and is frequently associated with benign causes. It is likely that appropriate training to ensure competency in performing musculoskeletal examinations during pediatric residency or postgraduate continuing medical education would result in a decrease of the number of diagnostic procedures and/or additional subspecialists referrals. Despite the generalized view that pediatric rheumatologists deal with extremely rare, complicated diseases, pediatric rheumatology clinics seem to be an ideal setting for this training, given that >50% of the patients referred to these clinics present the same musculoskeletal pathology recorded in this study.<sup>12-15</sup>

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#### REFERENCES

1. Vital and Health Statistics. Patient's reasons for visiting physicians: National ambulatory medical care survey, US 1977-78. DHHS publication 82-1717. Hyattsville, MD: National Center for Health Statistics; 1981
2. Øster J, Nielsen A. Growing pains. A clinical investigation of a school population. *Acta Paediatr Scand.* 1972;61:329-334
3. Naish JM, Apley J. Growing pains: a clinical study of non-arthritis limb pains in children. *Arch Dis Child.* 1951;26:134-140
4. Goodman JE, McGrath PJ. The epidemiology of pain in children and adolescents: a review. *Pain.* 1991;46:247-264
5. Calderon C, Gonzalez G, Valcarcel M. Diagnostic exposure in a primary care clinic during pediatric training. *P R Health Sci J.* 1992;11:125-128
6. Hoekelman RA, Starfield B, McCormick M, et al. A profile of pediatric practice in the United States. *Am J Dis Child.* 1983;137:1057-1060
7. García Llop LA, Asensi Alcoverro A, Grafiá Juan C, Coll Mas P. Estudio de la demanda en Atención Primaria pediátrica [Profile of practice in pediatric primary care]. *An Esp Pediatr.* 1996;44:469-474
8. Sección de Pediatría Extrahospitalaria de la AEP. Estudio del contenido de las consultas en pediatría extrahospitalaria [Spanish Pediatric Association, Section on Ambulatory practice. Analysis of presenting complaints in ambulatory pediatric practice]. *An Esp Pediatr.* 1990;32:241-245
9. Sherry DD, McGuire T, Mellins EM, Salmonson K, Wallace CA, Nepom B. Psychosomatic musculoskeletal pain in childhood: clinical and psychological analyses of 100 children. *Pediatrics.* 1991;88:1093-1099
10. Malleson PN, Al-Matar M, Petty RE. Idiopathic musculoskeletal pain syndromes in children. *J Rheumatol.* 1992;19:1786-1789
11. Aasland A, Flatö B, Vandvik IH. Psychosocial factors in children with idiopathic musculoskeletal pain: a prospective, longitudinal study. *Acta Paediatr.* 1997;86:740-746
12. DeNardo BA, Tucker LB, Miller LC, Szer IS, Schaller JG. Demography of a regional pediatric rheumatology patient population. *J Rheumatol.* 1994;21:1553-1561
13. Bowyer S, Roettcher P. Pediatric rheumatology clinic populations in the United States: results of a 3 year survey. *J Rheumatol.* 1996;23:1968-1974
14. Malleson PN, Fung MY, Rosenberg AM. The incidence of pediatric rheumatic diseases: results of the Canadian Pediatric Rheumatology Association Disease Registry. *J Rheumatol.* 1996;23:1981-1987
15. Grupo Español de Reumatología Pediátrica. Registro Nacional de Enfermedades Reumáticas Infantiles [Spanish Pediatric Rheumatology Group. National registry of pediatric rheumatic diseases]. *An Esp Pediatr.* 1996;45:346-350

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