# Tarsitis as an initial manifestation of juvenile spondyloarthropathy

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## Abstract

### Objective

*The aim of this study was to determine the frequency of tarsitis as one of the first symptoms of juvenile spondyloarthropathy (JSpA) and to analyze whether patients with tarsitis at onset differ from those without it.*

### Methods

*A retrospective chart review was performed, from January 1996 to September 2007, at a paediatric rheumatology unit of a tertiary university hospital.*

### Results

*Tarsitis was detected in one-third of the children diagnosed with JSpA. They had fever and received antibiotics due to a suspected infection more frequently than those without tarsitis. Inflammatory low back pain was extremely unusual among these patients.*

### Conclusion

*There were some differences between children diagnosed with JSpA initially affected with tarsitis and those without it. Patients with tarsitis as one of the first symptoms were often misdiagnosed as soft tissue infections.*

**Key words**

Tarsitis, juvenile spondyloarthropathy, children, tarsus, juvenile idiopathic arthritis

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## Introduction

Juvenile spondyloarthropathy (JSpA) often begins as asymmetric, peripheral arthritis of the lower limbs and enthesitis without axial involvement, in contrast to what is observed in adults (1, 2). Tarsitis can appear during the initial stages of the disease. Tarsitis is defined as foot inflammation from the ankle to the metatarsophalangeal joints. Tarsal involvement related to JSpA was first described by Burgos-Vargas *et al*. (3, 4). The acute phase is characterized by diffuse inflammation of tarsal soft tissues which can be shown by various imaging techniques, but it should be suspected from clinical data. If the inflammation persists, the structures may become damaged leading to fusion of the tarsal bones. This evolution has been named ankylosing tarsitis.

The aims of this study were to determine the frequency of tarsitis as one of the first symptoms of JSpA and to analyze whether JSpA patients with tarsitis at that time differed from those without it.

## Patients and methods

A retrospective chart review was performed on all patients diagnosed with JSpA at the paediatric rheumatology unit of a tertiary university hospital in Madrid**.** According to the Unit Registry between January 1996 and September 2007 3,995 new cases were evaluated. Of those, 283 (7%) corresponded to inflammatory chronic arthritis being 37 of them diagnosed with JSpA.

The patients were classified according to the *European Spondyloarthropathy Study Group (ESSG)* criteria (5). Subsequently, the enthesitis related arthritis criteria of the *International League of Associations for Rheumatology (ILAR)* (6) were applied.

Variables collected from the beginning of the symptoms until diagnosis of JSpA included demographic data, clinical manifestations (tarsitis, arthritis of other joints, enthesitis, dactylitis, lumbar/sacroiliac pain, fever and administration of antibiotics due to suspected infection), laboratory findings (erythrosedimentation rate and HLA-B27 status) and imaging studies (radiographs, bone scans and magnetic resonance imaging [MRI]) of the tarsus and pelvis.

Tarsitis was defined as inflammation of the mid-foot causing pain and limping documented by a physician. Imaging techniques were consistent with the clinical profile. Other etiologies such as trauma or infections were excluded. To assess tarsal involvement at diagnosis the *Spondyloarthropathy Tarsal Radiographic Index* (SpA-TRI) was applied categorizing the lesions in a scale that ranged from 0 (normal) to 4 (bony ankylosis) (7).

At the last visit, before September 2007, the number of patients diagnosed with ankylosing spondilytis (AS) or ankylosing tarsitis were recorded.

Statistical analyses were performed using the SPSS 11.0 package. Descriptive characteristics of variables were represented as median, mean and standard deviation or percentages. Comparisons between groups were done using the Mann-Whitney U-test for quantitative variables, and Chi-square and Fisher's exact test for qualitative variables. Differences were considered significant at ($p$<0.05).

## Results

During the study period 37 patients were diagnosed with JSpA. All children fulfilled *ESSG* criteria. However, only 32 (86%) were allocated to the *ILAR* enthesitis related arthritis category. Five patients were excluded: three because of positive family history of psoriasis in a first-degree relative; one of these had disease onset at 17.3 years of age. Another one, a boy, was diagnosed with reactive arthritis. Finally a girl presented unilateral sacroiliitis and ankle arthritis with no other criteria.

Thirteen out of 37 (35%) patients had tarsitis as one of the first symptoms. In three of them unilateral tarsitis was the only sign of musculoskeletal involvement. Bilateral tarsitis was found in 4 of the other 10 children. Only one (8%) of the 13 cases with tarsitis at diagnosis had lumbar/sacroiliac pain, in contrast to 13 of 24 (54%) without tarsitis. Fever and antibiotic treatment before JSpA diagnosis were more frequently recorded among those who started with tarsal inflammation. The main clinical and laboratory characteristics of the series are reported in Table I. At that

**Table I.** Main characteristics of 37 patients with juvenile spondyloarthropathy at diagnosis, classified according to the presence or absence of tarsitis.

Values are shown as median, mean ± SD (min-max) and number (percentage)

| | With tarsitis (n=13) | Without tarsitis (n=24) | *p*-value |
|---|---|---|---|
| *Demographic characteristics* | | | |
| Male | 9 (69) | 17 (71) | 0.60 |
| Age at onset (y) | 10, 10 ± 4 (3.6-17.3) | 9.4, 9.6 ± 2.1 (3.6-14.3) | 0.64 |
| Clinical characteristics | | | |
| Time to diagnosis (y) | 0.3, 0.7 ± 0.7 (0.04-2) | 0.4, 0.9 ± 1.2 (0.04-5.3) | 0.42 |
| Age at diagnosis (y) | 10.3, 10.7 ± 4 (3.8-17.7) | 10.5, 10.6 ± 2.4 (4-14.7) | 0.86 |
| Lower limbs arthritis* | 11 (85) | 21 (88) | 0.58 |
| Asymmetric arthritis | 10 (77) | 21 (88) | 0.34 |
| Enthesitis | 7 (54) | 11 (46) | 0.45 |
| Dactylitis | 3 (23) | 5 (21) | 0.59 |
| Lumbar/sacroiliac pain | 1 (8) | 13 (54) | 0.006 |
| Fever** | 6 (46) | 4 (17) | 0.06 |
| Antibiotic treatment** | 6 (46) | 1 (4) | 0.004 |
| *Analytical data* | | | |
| HLA-B27 (+) | 11 (85) | 21 (88) | 0.58 |
| ESR mm/h | 56, 56 ± 28 (13-125) | 44.5, 45 ± 29 (4-104) | 0.26 |

ESR: Erythrosedimentation rate.
*Predominantly lower limbs arthritis; **Fever and antibiotic treatment before juvenile spondyloarthropathy diagnosis.

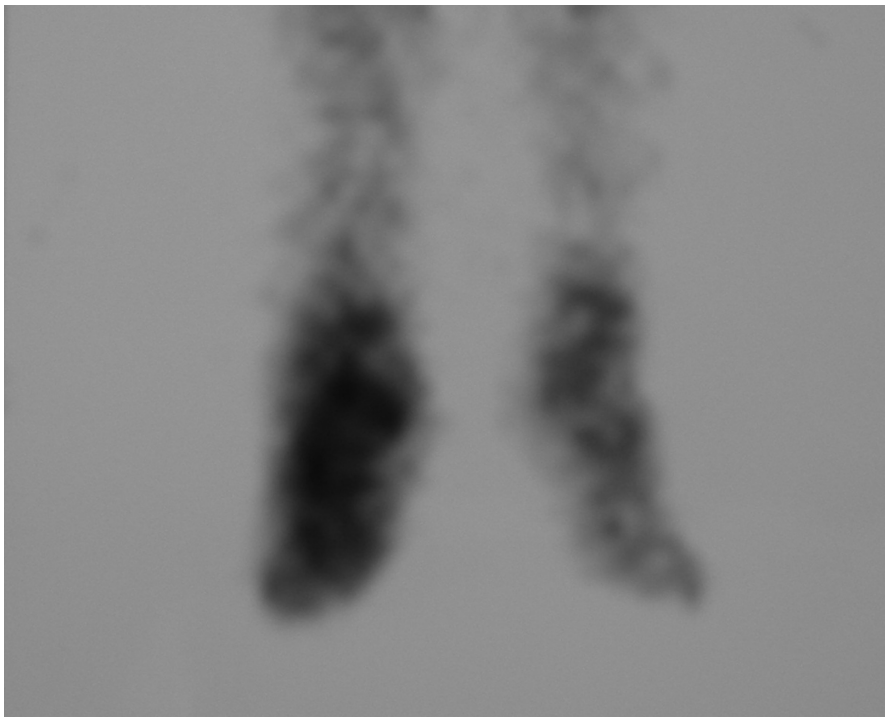

**Fig. 1.** Vascular phase of a bone scan demonstrating increased uptake of technetium 99m in soft tissues. It corresponds to a boy diagnosed with juvenile spondyloarthropathy who presented with left tarsitis as an unique manifestation of the disease.

time none presented uveitis, and all had negative antinuclear antibodies.

According to the radiographic index tarsal involvement at diagnosis was between grades 0 (normal) and 1 (osteopenia) in all cases. Gammagraphic bone scans of the feet performed in 6 patients showed increased uptake of the isotope (Fig. 1) and MRI carried out in 5 showed signal enhancement of soft tissues (Fig. 2). Radiographs of sacroiliac joints obtained in 12 of 14 children with inflammatory lumbar/sacroiliac pain were normal except for one case. That patient fulfilled diagnostic criteria for AS at the first visit and conventional radiography and MRI confirmed the diagnosis. He consulted us 5.3 years after his symptoms began, had no tarsitis, and later developed Chron's disease.

At the last visit, after a mean disease duration of 3.8±2.6 (0.09-11.3), median 4.3 years, with no differences between patients with and without tarsitis ($p$=0.22), two children fulfilled criteria for ankylosing spondylitis, after 5 and 9 years of disease duration, before tumor necrosis factor antagonists were started. Neither of them presented tarsitis as an initial symptom. One was the boy affected by Chrön's disease mentioned above. The other was a boy diagnosed with JSpA in 1996 when he had back pain and a normal sacroiliac joints x-ray. Later in 2005 he complained again of back pain and his x-ray showed grade 2 bilateral sacroiliitis. Etanercept was started and his disease has been inactive since. None of the patients in the series had developed ankylosing tarsitis by the end of the study.

## Discussion

The *ESSG* criteria have demonstrated high sensitivity (83.9%) and specificity (87.5%) for the diagnosis of JSpA (8). It is well known that the exclusion system of the *ILAR* criteria does not allow the classification of all patients (9).

The tendency of JSpA towards males, with positive HLA-B27 antigen, asymmetric peripheral arthritis in lower limbs, enthesitis, and dactylitis has been previously described (10-12).

The frequency of the spondylarthropathy from the registers of paediatric rheumatology clinics is around 10% (13).

In this series, tarsitis was one of the initial symptoms of JSpA in one-third (35%) of the patients. According to other studies up to 71.4% of children with JSpA developed tarsitis in the first six months of the disease (14).

At initial stages of JSpA tarsitis should be suspected by clinical data, and imaging techniques should be consistent with the clinical profile. Tarsal radiography helps to exclude osteolitic and other lesions, whereas bone scan and

MRI reveal the inflammation sites. The biggest diagnostic challenge is unilateral tarsal inflammation and fever with no other manifestations related to disease.

The present study has significant limitations, as it is a retrospective analysis with few patients and short disease duration. It cannot be concluded that tarsitis is a form of JSpA without sacroiliitis nor spondylitis. However, axial involvement was unfrequent in cases with tarsitis at disease onset, only 8%, in contrast to 54% of the children without it. Moreover none of the patients with tarsitis at diagnosis has developed axial involvement. However, long-term studies have shown that JSpA is associated with the development of spondylitis and sacroiliitis years after onset (15), indicating that this is a possible outcome for those patients.

Despite the limitations of this study there were some differences between children diagnosed with JSpA initially affected with tarsitis and those without it. In the first group, 46% of the children had fever and received antibiotic therapy because of a suspected soft tissue infection, whereas only 17% of the patients without tarsitis at onset had fever, and only 1 (4%) was treated with antibiotics. This indicates that the diagnosis of JSpA in children with tarsitis usually requires the exclusion of an infectious etiology. This diagnostic dilemma may also be faced when confronting a patient with monoarthritis of the knee, ankle or hip, although the anatomy of those joints allows the clinician to obtain synovial fluid to make the correct diagnosis.

In summary, patients with JSpA and tarsitis as one of the first symptoms were often misdiagnosed with infections and the evidence of axial involvement was low in them.

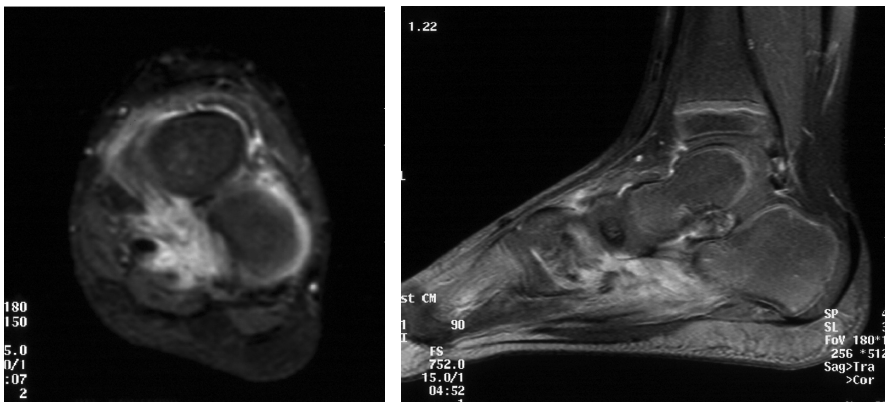


**Fig. 2.** MRI of the foot of the same boy with tarsitis represented in Figure 1. The cross-section and lateral view show gadolinium signal enhancement of soft tissues.

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