PAEDIATRIC RHEUMATOLOGY
NEUROFIBROMATOSIS MASQUERADING AS MONOARTICULAR JUVENILE ARTHRITIS
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SUMMARY
A 3-yr-old boy presented with a monoarthritis. Persistence of the condition and some unusual features led to re-evaluation of the original investigations, when a diagnosis of extensive plexiform neurofibroma involving his right leg was made. This previously unreported presentation of neurofibromatosis is discussed.

KEY WORDS: Monoarthritis, Neurofibromatosis, Plexiform neurofibroma, Magnetic resonance imaging.

CASE REPORT
A 3-yr-old boy was referred to his local orthopaedic department with a 2-month history of pain and swelling of the right knee. His symptoms had developed following a fall. All other joints were normal and there was no history of systemic illness. The knee was warm and swollen.

A full blood count (FBC) was normal, erythrocyte sedimentation rate (ESR) 21 mm/h, immunoglobulins normal, rheumatoid factor and antinuclear antibodies negative, and a plain X-ray normal. Arthroscopic examination revealed synovial thickening in the suprapatella pouch. Histologically, this was diagnosed as a non-specific synovitis (Fig. 1). A technetium bone scan showed increased uptake in the middle of the right femur with normal uptake in both knees. The unusual bone scan findings were not taken further at that time.

He improved with symptomatic therapy, although the swelling never disappeared. The persistent nature of his symptoms led to a second orthopaedic opinion and subsequently a rheumatology referral. Clinical examination revealed a tender, swollen knee joint with a 5° fixed flexion deformity. He was noted to have multiple café-au-lait spots, a feature he shared with two brothers and his mother. Plain X-rays again showed only joint swelling and blood tests were normal except for an ESR of 20 mm/h. Ultrasound demonstrated a well-demarcated low-echogenic mass anterior and superior to the knee joint with increased echogenicity in its centre. His symptoms improved with non-steroidal anti-inflammatory drugs and physiotherapy.

As a result of the ultrasound scan and the unusual appearance of the previous bone scan, the original biopsy was reviewed and the histological diagnosis changed to a plexiform neurofibroma (Fig. 1). Magnetic resonance imaging (MRI) revealed a multilobulated high-signal-intensity mass involving predominantly the vastus lateralis muscle extending from the greater trochanter down to the level of the knee joint (Fig. 2). The mass also extended into the vastus medialis and intermedius, as well as the subcutaneous fat around the knee joint. The lesion was consistent with a plexiform neurofibroma which was thought to be inoperable.

Five years after presentation, he complained of increased pain and warmth in the right thigh. There were concerns about malignant change, although repeat MRI scanning showed no evidence of neurofibrosarcoma. He had, however, developed a leg-length discrepancy secondary to overgrowth. This required periosteal stripping of the normal leg in an attempt to encourage leg lengthening.

DISCUSSION
We have described a unique case of neurofibromatosis (NF) masquerading as a monoarticular arthritis at presentation.

The first recorded descriptions of NF were in the late 18th century by Tilessius and Akenside. Von Recklinghausen realized the true nature of the lesions in 1882. In 1918, Preiser and Davenport established NF as an autosomal dominant condition. NF is a phacomatosis which affects neuroectodermal and mesodermal tissues; the syndrome is characterized by the clinical triad of cutaneous lesions (café-au-lait spots and neurofibromata), mental deficiency and skeletal dysplastic deformities. It is the commonest single-gene disorder of the nervous system, affecting one in 3000 live births, with over half of cases having an autosomal dominant inheritance pattern. The remainder result from spontaneous mutations. Two distinct forms exist: type I (NF-1, von Recklinghausen’s disease) and type II (NF-2, central NF). The NF-1 gene has been localized to chromosome 17; the NF-2 gene to chromosome 22 [1].

Clinical manifestations range from asymptomatic lesions through to severe cosmetic concerns, medical and neurological disability, and premature death [1]. NF-1 usually presents during the first decade of life and is associated with prominent neurological, systemic, cosmetic and orthopaedic manifestations. NF-2 is...
characterized by bilateral acoustic neuromata, although other brain and spinal tumours are seen. The range of symptoms, reflecting the extent of disease, can include endocrine, osteoarticular and neurological events. The osteoarticular symptoms are secondary to osseous dysplasia resulting in bony hyperplasia ranging from focal overgrowth to gigantism of a whole limb, hypoplasia or even aplasia. Pathological fractures and pseudoarthrosis including severe kyphoscoliosis may result from defective bony tissue. Neurological symptoms are secondary to the pressure effects of tumours such as schwannomas, acoustic neuromas, gliomas and plexiform neurofibromas.

Although several authors have reviewed the orthopaedic manifestations of NF [2, 3], presentation as an acute monoarthritis has not previously been reported. Spinal deformity is the most common orthopaedic abnormality, occurring in up to 77% of cases in some series [2]. In a review of 44 children, Joseph [2] reported three unusual features: thoracic lordoscoliosis, protrusio acetabuli and monomelic (single limb) NF. One patient had right upper limb hypertrophy associated with a plexiform neurofibroma and diffuse hyperpigmentation. He also reported eight patients with limb overgrowth, six involving the leg.

Plexiform NF accounts for up to 20% of patients [3] and has, as in our patient, been reported to occur in association with limb overgrowth [2] and in more unusual sites like the liver [4].

The importance of imaging in the diagnosis and management of NF is clearly illustrated in our patient where the MRI scan alone revealed the true extent of the lesion. MRI has rapidly become one of the most

Fig. 1.—Synovial biopsy. This was originally reported to show non-specific synovial thickening. The histology was later reviewed and confirmed as showing connective tissue containing several large rather tortuous nerve trunks consistent with a plexiform neurofibroma (H & E × 115).

Fig. 2.—Magnetic resonance scan of the right thigh. This MRI photograph demonstrates a multilobulated high-signal-intensity mass involving predominantly the vastus lateralis muscle extending from the greater trochanter down to the level of the knee joint. The mass also extends into the vastus medialis and intermedius as well as the s.c. fat around the knee joint. The lesion is consistent with a plexiform neurofibroma.
useful radiological techniques, offering superior soft-tissue images [5] as well as helping in the screening of family members [6, 7]. MRI also allows the natural history of lesions to be followed and, as demonstrated in our case, is particularly useful if malignant transformation is suspected.

Although our patient had a rare, if not unique, mode of presentation, NF should be added to the long list of possible causes of a monoarthritis. It is particularly important to keep an open mind if the histologist reports ‘non-specific synovitis’ as this reflects the absence of more specific features rather than suggesting a diagnosis. Unusual characteristics should lead to a review of the clinical diagnosis and re-appraisal of investigations, including any histology. This case also emphasizes the importance of general inspection of the skin in anyone with arthritis. The cutaneous manifestations of NF may offer the all important clue to the cause of a musculoskeletal problem including, now, arthritis.

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REFERENCES