1984 American Olympic team about 11% of athletes had asthma or exercise induced bronchoconstriction.[1] The figures agreed with those of Weiler *et al*, who found self reported asthma in 12% of football players; basketball players had a low asthma prevalence.[29] In a study from Portugal Gomes *et al* found normal bronchial responsiveness in élite runners.[30] In another study swimmers had a higher prevalence of asthma and bronchial hyperresponsiveness than other athletes and the authors postulated a relation with ambient swimming pool conditions.[31]

To our knowledge there are no other studies of skiers or other athletes performing exercise at low temperatures. From the few reports available there is no evidence that strenuous training by itself increases the risk of asthma. Strenuous training at low temperatures, however, seems to be pathogenetic for asthma, possibly due to the repeated breathing of large amounts of cold air.

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Importance of placement of intra-articular steroid injections

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Intra-articular corticosteroid injections are widely used in clinical practice, but their effect is variable and their value remains doubtful.[1] One possible explanation for this variability might be inaccurate injection. We conducted this study to determine the accuracy of joint injections, factors associated with inaccuracy, and the effect of placement on clinical response.

Patients, methods, and results

The study was approved by the local hospital ethics committee. Patients in whom intra-articular steroid injections were indicated were asked if they wished to participate. After patients had given informed consent, synovitis in the index joint[2,3] and at other sites was assessed.[4] Local synovitis was graded according to an articular index developed for use at the knee. An "active," inflamed knee is defined by the presence of three or more of the following: stiffness lasting for more than 30 minutes in the early morning or after inactivity, synovial thickening, local warmth, tenderness, and moderate synovial effusion.[2,3] Depot methylprednisolone was used for all injections and was mixed with a radiographic contrast medium, iopamidol. The index joint was aspirated and injected, and the patient had a single plain radiograph of this joint. Patients were reviewed at six weeks by the same assessor; the Ritchie index and the assessment of synovitis were repeated blind to the results of the previous radiological clinical findings.[2-4] Radiographs were read blind by one consultant radiologist (AM). Results were analysed by a χ^2 test.

Overall, 109 patients were studied; their median age was 68 (range 23-89). Forty four patients had rheumatoid arthritis, 52 osteoarthritis, and 13 other disease. The joints injected and the accuracy of placement at each joint site are shown in the table. One patient failed to attend for radiography and thus 108 radiographs were evaluable. Fifty six injections were intra-articular and 31 extra-articular; in 21 the location was uncertain because of a lack of contrast in the radiograph.

Accurate injection was associated with successful aspiration of synovial fluid (38/56 intra-articular injections had had successful aspiration compared with 4/21 uncertain injections and 14/31 extra-articular injections; $\chi^2=15{\cdot}4$, df=2, $p<0{\cdot}0005$).

Six patients did not attend at six weeks, leaving 102 patients in whom clinical response could be studied. A reduction in joint inflammation (active becoming inactive) was associated with accuracy of injection—28 out of 54 intra-articular injections, seven out of 30 extra-articular injections, and 10 out of 18 uncertain injections were associated with improvement ($\chi^2=7{\cdot}52$, df=2, $p<0{\cdot}05$). Only patients in whom a joint was initially classified as active would be able to show reduction in inflammation, so data on this group were analysed separately. Results were similar (28/47 intra-articular injections, 7/19 extra-articular injections, and 10/17 uncertain injections were associated with improvement, $\chi^2=3{\cdot}0$, df=2, $p=0{\cdot}22$); none of the patients with initially inactive inflammation developed active inflammation. When local effects on the joint were taken into account—that is, the index joint was removed from the Ritchie index—accuracy of injection had no significant effect on the Ritchie index.

The doctors who gave the injections were a consultant, two senior registrars, and two research registrars in rheumatology; the accuracy of their injections was one out of two, four out of 11, 16 out of 31, 33 out of 56, and 16 out of 31 respectively.

Radiological placement of intra-articular steroid injections in 108 patients

Joint	Extra-articular	Uncertain	Intra-articular
Knee	17	3	39
Shoulder	6	12	2
Wrist	2	2	4
Thumb carpometacarpal	1	2	0
Finger:			
Metacarpophalangeal	0	1	0
Distal interphalangeal	0	1	0
Elbow	1	0	5
Ankle	3	0	6
Acromioclavicular	1	0	0
Total	31	21	56

Comment

This study shows that intra-articular injections are often inaccurate and that this may be clinically important.[5] Indeed, inaccurate injection might contribute to the incidence of local tissue damage (atrophy of soft tissue and fat). Surprisingly, accuracy at the knee and shoulder—the two most commonly injected joints—was poor. The results obtained in the uncertain group are difficult to interpret and may reflect the different range of joints injected: a high proportion of shoulders and a low proportion of knees. This could certainly explain the lower rate of successful aspiration. Although the doctors who gave the injections had differing rheumatological experience, we were unable to show any effect of seniority. These results may imply, however, that current training in injection techniques needs to be refined.

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A PATIENT WHO CHANGED MY LIFE

Acute liver failure and candidate hepatitis F

He was only 13 years old and I knew him less than one week. Five years later I moved and changed the direction of my career as a consequence of our brief encounter.

He became ill in the summer of 1985. The flu-like illness progressed relentlessly to acute liver failure. Sporadic non-A, non-B hepatitis is the most common, presumed viral, cause of acute liver failure in Britain and the United States. The agents remain unidentified and survival without liver transplantation is below 20%.

We met when he was in grade IV hepatic encephalopathy and awaiting urgent liver transplantation. Two days later he was sitting out of bed and tuned in to a personal radio. One week later the liver failure recurred. The clinical picture resembled a haemorrhagic fever. He bled from multiple sites and died soon after. The graft was swollen and haemorrhagic. There was little evidence of rejection and the surgical anastomoses were faultless.

Electron microscopy showed virus-like particles, resembling arboviruses, in his native liver.[1] By early 1988 we had collected two further cases. Importantly, abundant particles were found in the haemorrhagic grafts if the liver failure recurred. I believed there was sufficient evidence to implicate a novel agent. We needed a scientist to clone its genome.

The turning point came in October 1988. The designated refrigerator containing the liver bank had thawed mysteriously while I was abroad. Undeterred, I restarted the collection, this time determined to tackle the molecular biology myself. By 1990, five years on, we had a total of nine cases.[2]

In 1991 I moved from south to north London to enter the world of molecular virology. Full time research can be lonely. Fifteen years of clinical practice had made me dependent on the daily rewards of dealing with patients. Science can be exhilarating, especially after a lengthy gestation.

I have tried to justify to other clinicians why I have forsaken temporarily the relative security of clinical medicine in pursuit of science to help solve an uncommon disease. As a clinician I owe a tremendous debt to my scientific colleagues who have found time to teach me and encourage my appreciation of their art. "Nature is nowhere accustomed more openly to display her secret mysteries than in cases where she shows traces of her workings apart from the beaten path; nor is there any better way to advance the proper practice of medicine than to give our minds to the discovery of the usual law of Nature, by careful investigation of cases of rarer forms of disease."[3]—ELIZABETH ANN FAGAN *is a Wellcome senior graduate research fellow in London*

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