

## Guest editorial

# Increasing incidence of clubfoot Changes in the genes or the environment?

Idiopathic clubfoot (idiopathic congenital talipes equinovarus) is a common and challenging musculo-skeletal deformity. Worldwide, the incidence varies from 0.5 to 7 per thousand live births. In Scandinavia, the reported incidences for the period 1913–1990 have been uniform at around 0.7–1.0/10<sup>3</sup>. In this issue of *Acta Orthopaedica*, two national studies report increasing incidences of idiopathic clubfoot. In Denmark, Krogsgaard et al. found an incidence of 1.2/10<sup>3</sup> for the period 1978–1993, and in Sweden Wallander et al. found an incidence of 1.4/10<sup>3</sup> for 1995–1996. In all epidemiological studies, there are uncertainties regarding variation in diagnostic criteria and in registration methods. The diagnosis of idiopathic clubfoot is based on clinical examination (irreducible equinus, varus of the hindfoot, adduction of the forefoot, cavus, and an “empty” heel pad) and is relatively straightforward. Different methods for the detection of patients were used in these two Scandinavian studies. In the Danish survey patients were identified from two different national registers; individual data were then drawn from hospital records. In the Swedish report, all clinics treating clubfoot were identified; a specific person was then recruited at each hospital to be responsible for registration and reporting of new clubfoot patients over the 2-year study period. The registration methods are thus quite different, but the results are the same—an increase in the incidence of idiopathic clubfoot.

The pertinent question is then: Why do we have an increase in the incidence of clubfoot in Denmark and Sweden? Since the etiology of clubfoot is still unknown, explanations for the increased incidence are necessarily speculative. The authors discuss two main possible hypotheses: either change in the

genetic material of the population or change in the environment. The incidence of clubfoot in Scandinavia seems to be relatively low. Immigration from non-Scandinavian countries could therefore be a possible explanation. For the last years of the study period, the Danish group found a small but insignificant increase in the relative number of parents of children with clubfoot who were from countries outside Scandinavia. This shift in the genetic pool was, however, not sufficiently large to explain the overall increase in incidence observed. In agreement with this hypothesis, a higher incidence was also found in the southern part of Sweden, where a higher proportion of immigrants was found. An alternative explanation for the higher incidence in southern Sweden could be that the population density there is the highest in the country. Indeed, the authors of the Danish study concluded that incidence of clubfoot increases with population density. They speculate that exogenic factors such as environmental stress (traffic, pollution, noise), stress of urban living (misuse of alcohol, tobacco, drugs), and also a higher risk of exposure to infections are more common in a more densely populated area, and could be a reason for the increasing incidence.

Studies on the epidemiology of clubfoot are important. They may lead us to the etiology of the deformity and, if the etiology is found, this would provide a basis for further improvements in the treatment and perhaps even prevention of this common congenital deformity.

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Wallander H, Hovelius L, Michaelsson K. Incidence of congenital clubfoot in Sweden. *Acta Orthop* 2006; 77: 847-52.