

SUMMARY

Idiopathic pes equinovarus (also referred to as clubfoot) is a congenital deformity of the foot and lower leg; it has five components: equinus, varus, adductus, cavus and supination of the foot. At present two principle methods are mostly used for the treatment of clubfoot: physiotherapy and continuous motion without immobilization and the Ponseti method (serial manipulation, cast application, Achilles tenotomy and transposition of m. tibialis ant.). This method has been reported to have short-term success rates approaching 100%, and the long-term results have been equally impressive. We believe, however, that the data on the success rate may be significantly influenced by the duration of the period after termination of the treatment. The purpose of the first part of our study was, therefore, to compare the short-term (up to three years) and long-term (three to seven years) results of treatment of idiopathic clubfeet with the Ponseti method and to determine the factors for recurrence. We have tested the hypothesis whether it is possible to cure all clubfeet with the Ponseti method only. We have found significant difference between the evaluation of the short-term and long-term results: the number of relapses during the first three years of treatment, indicated for surgical intervention, was markedly less (5%) as compared with patients where the treatment started six to eight years ago (65%). For an explanation of this finding it is necessary to take into consideration – particularly for the oldest group - the learning curve. On the other hand, the results from the year 2007 and onwards were significantly better: the number of relapses reached only 44%. Primary correction of pes equinovarus is possible in almost 100% of patients, but for the subsequent solution of relapses it is necessary to use surgical intervention. It follows from our results that – besides insufficient parent's compliance - the main risk factor is time: in patients older than three years it is impossible to use the Ponseti method only but it is necessary to use the surgical intervention. We have thus confirmed our hypothesis that to cure all relapses with the Ponseti method is impossible. We have observed during the surgery that the macroscopic structure of the connective tissue is different on the medial and lateral parts of the tarsus: the medial part is more rigid. This observation supports the hypothesis that connective tissue, particularly fibroblasts and growth factors are involved in the pathogenetic mechanisms responsible for the development of clubfoot. To obtain a more global understanding of the protein composition of the extracellular matrix, we performed in the second part of our study the proteomic analysis of the connective tissue in patients with clubfoot. We have observed for the first time that the extracellular matrix in clubfoot is – besides the collagens I, III and TGF β – composed from another 16 proteins, including collagens V, VI and XII. Proteomic analysis of samples from the medial and lateral part of tarsus revealed differences in the protein composition: content of collagen VI, asporin, mimecan, prolamin and TGF β was higher in the medial, more rigid part of the joint. We have thus confirmed the hypothesis that protein composition of the extracellular matrix might play an important role in the pathogenesis of clubfoot. The analysis of the mechanisms that regulate extracellular matrix remodeling and formation of contracture will be important for understanding the biology of this pathological process and the implementation of preventive and therapeutic strategies.