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DEGENERATIVE CHANGES IN THE FIRST METATARSO-PHALANGEAL JOINT OF BALLET DANCERS

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In 20 female performers of classical ballet the range of dorsiflexion of the big toe was found to be significantly decreased. However, in only one case was the decrease sufficiently great to interfere with the dancer's ability to perform. In spite of the severe stress put on the first metatarso-phalangeal joint in dancers the resulting degenerative changes were found to be minor and in most instances without clinical consequences. The results indicate that professional ballet, contrary to what is generally believed, rarely has harmful effects on the first metatarso-phalangeal joint.

Key words: ballet; dancing; hallux rigidus

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Degenerative changes, mostly osteophytes, particularly in the talar joint have been demonstrated in female performers of classical ballet (Brodelius 1961, Miller et al. 1974). Dunn (1965) pointed out the importance of protection of the big toe and the metatarso-phalangeal joints in dancers, particularly female dancers who dance with their feet in the "sur la pointe" position. Dancing with a rigid first metatarso-phalangeal joint puts considerable strain on the foot and ankle and tends to create a "sickling" position with supination of the foot which in turn causes pain and spoils the dancing posture. Similar observations have been presented by Miller et al. (1974) indicating that hallux valgus, bunions and callosities are common in the feet of female dancers. So far, no reliable method has been devised to protect the first metatarso-phalangeal joint in female dancers, nor has any series of successful surgical procedures for hallux rigidus in female performers of classical ballet been presented.

The objective of this study was to measure the range of motion in the first metatarso-phalangeal joints in female ballet dancers and to make a comparison with a control population of non-dancers.

MATERIAL AND METHOD

Included in the study were 20 female ballet dancers, members of the ballet company of the Malmö City Theatre, and 34 approximately age-matched controls, mainly hospital employees without any history of injury or disease of the forefoot. The age of the dancers was 28 ± 7. They were all professional and had been dancing since early childhood. The range of motion was tested in the same way and by the same investigator in all the subjects using a square rule (Figure 1). In the ballet dancers additional measurements were

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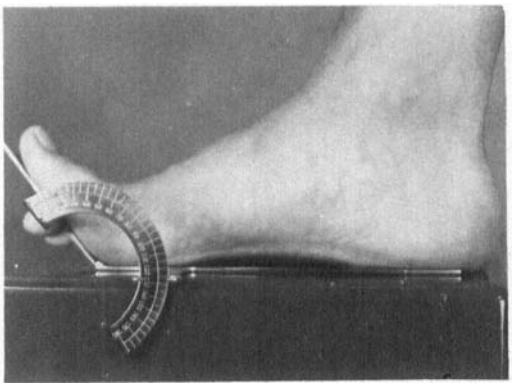

Figure 1. Measurement of dorsiflexion of the first metatarso-phalangeal joint. The maximum dorsiflexion is measured with the patient standing and the ankle joint in the neutral position.

taken immediately after a performance. The average of left and right was used since there was no systematic left-right difference.

RESULTS

There was no significant change in the range of motion with age either in the dancers or in the controls (Figure 2). There was, however, a difference in the range of motion between the two groups which only amounted to a few degrees; this difference was significant ($0.02 > P > 0.01$). In fact, only one dancer (K.H., aged 23) deviated significantly from the rest of the cases and this girl also had

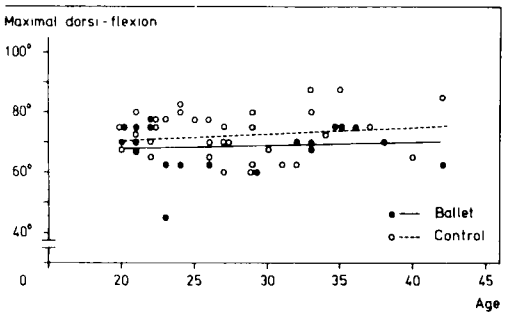

Figure 2. The relationship of age and big toe dorsiflexion in female dancers and age-matched controls.

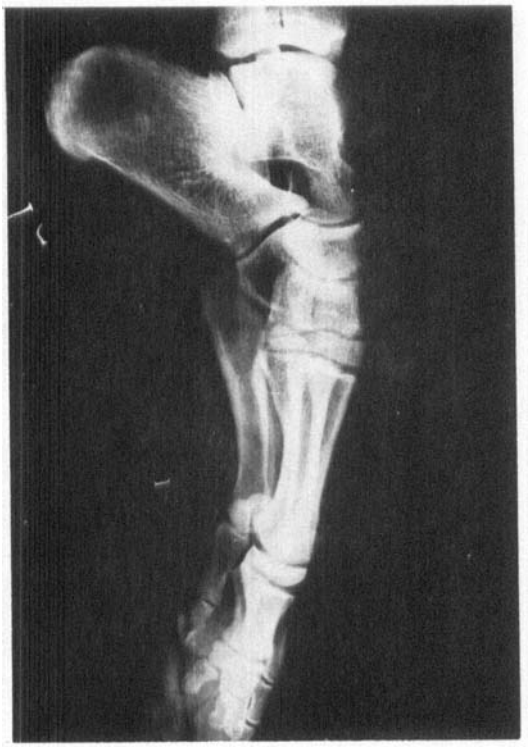

Figure 3. The foot of dancer (K.H.) in "sur la pointe" position. Note the perfect arch of foot and toes which supports the entire body weight.

clinical symptoms associated with her dancing. There was no difference in the range of motion in ballet dancers before and immediately after a performance. Radiograms were obtained of the six female dancers who had the most restricted range of motion. Of these six, three were found to have small osteophytes on the margins of the metatarsal head; however, the radiological signs were not associated with clinical symptoms except in the one girl mentioned above with a range of motion decreased by about 40 per cent.

DISCUSSION

There is little doubt that in female ballet dancers a tremendous load is taken by the first metatarso-phalangeal joint in the "pointe" position and that this joint is

subjected to repeated trauma over the years (Figure 3). Also, the appearance of the feet of these performers with large multiple callosities supports the concept that the toes and particularly the big toe are weight-bearing structures. Under these conditions it is surprising that so few and so moderate objective changes were found. It should be noted that the radiological changes mentioned above were only osteophytes and not osteoarthritis in its true sense. In conclusion, ballet dancing may not be as harmful to the forefoot of young women as has been proposed in the past.

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