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Eversion of the foot at touchdown

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Normal bipedal human walking over a flat surface, divided in a stance phase and a swing phase for each leg, is characterized by (among others) heel strike at the beginning of stance (1). To prepare for each following heel contact, the foot is extended at the ankle joint, at the end of the swing phase. The strong ankle extensor muscle *m. tibialis anterior* however, responsible for this movement, simultaneously causes foot inversion too (2). Foot inversion is defined as turning the sole of the foot inward, while eversion is turning the sole of the foot outward. Normally, heel contact is immediately followed by an eversion of the foot, to prevent a walking person so to say to land on the lateral side of his foot which easily leads to a so-called "inversion traumatism" (3) Because inversion traumatisms constitute e.g. the most frequent sport traumatisms (3), while at the same time foot eversion is considered as being typical for human plantigrade walking (4), it may be interesting to analyse walking strategies in non-cursorial mammals, such as primates and predecessors like the marsupial opossum (Didelphis) whose terrestrial locomotion is plantigradequadrupedal (5). Various higher primates lack initial heel contact in stance (6), as do lower primates and opossum (2). Regarding extinct marsupials moreover, it is clear that "Thylacynidae (had) feet small with spreading toes" and "In gait, the Santa Cruz thylacynes were probably plantigrade" (7). Thylacine footage reveals spreading of toes indeed, during its swing phase (8). This had been observed already, it was explicitly described in *Didelphis* (9, 10). Here abduction and extension of toes does include foot eversion. The latter is the more relevant, in view of the extreme inversion of the opossum foot at end-stance (11, 12). In general, mm. fibulares are held responsible for repositioning the foot from inversion to eversion. M. fibularis tertius, acting simultaneously with toe extensor muscles, deserves particular attention, especially in man (13). In the swing phase *m. fibularis tertius* "levels the foot and helps the toes to clear the ground" (4).

As a practical application of some of the above observations and analyses we cite a recent report concerning strength-training, applied to *mm. fibulares* in particular, in youthful gymnasts (14). This training, performed as a warming-up, produced longer periods of continuous *mm. fibulares* activity (compared to non-trained gymnasts), to prepare for efficient foot eversion at touchdown.

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