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Muscles involved in foot eversion movements during the swing phase of gait - some comparative-anatomical and functional-morphological aspects

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Surinam opossum *Didelphis marsupialis*, considered as a predecessor of primates including man, shows extreme inversion of hindfoot at late stance during quadrupedal walking (Narain et al., 2003). In inversion, the sole of the foot turns inward, in eversion it turns outward. Repositioning of the opossum foot occurs in swing, eversion starting at toe-off (Narain et al., 2009). In midswing, *Didelphis* keeps its foot horizontally, as video-grabbed images reveal. Tendons of extensor digitorum brevis, and of peroneus muscles, passing behind the fibular malleolus “pulley”, may contribute to foot eversion in *Didelphis* (Lewis, 1966). Pronator profundus muscle, revealed by microdissection, may account for rotating the crus medially during swing (Narain et al., 2005). Various muscles might therefore be involved in guaranteeing opossum foot eversion at touchdown.

With regard to eversion in bipedal primates like man, the strength of peroneus muscles may be trained, to guarantee stable foot positioning at touchdown. Therefore, after approval by our medical-ethical committee, a group of nine youthful gymnasts without a medical history was trained by warm-up exercises four times weekly intended to reinforce peroneus muscles. After four weeks this group performed the single-leg standing balance on board longer than a control group exercising with non-specific warm-ups. Evertor muscles reinforcement might therefore be used to prevent inversion traumatisms.

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