Introduction
Protecting distal muscle effectors from atrophy is a major challenge in patient’s care after proximal nerve trunk injuries (particularly ulnar nerve) and several distal motor nerve fiber transfers have been suggested for this purpose. More recently, sensate fiber protection has proven effective in this task, avoiding harm to motor donors. The present study was designed to test whether through an easy dissection, the radial sensate dorsal branches to the 1st space were capable to reach in the palm the deep motor branch of the ulnar nerve to perform a comfortable coaptation. Moreover, a histomorphometric analysis was planned to show whether anatomical structures (diameter, cross-sectional area, number and density of fascicles and axons) of the donor sensate branches reached the standards proposed by the literature for efficient nerve transfer.

Materials and Methods
An anatomical study was undertaken on 16 fresh cadavers from the Anatomy Labs of Bordeaux and Thessaloniki Universities and from the International Center for Learning Orthopaedics in Arezzo (Italy). The study was approved by the Review Board for Anatomical Research of the Italian Association for Surgery of the Hand and by the Ethics Committee Academical Authorities. A blunt dissection was then performed through the first interosseous muscle to reach on the volar aspect the terminal branches of the deep motor branch of the ulnar nerve (fig. 2), identifying this as the site for coaptation, whether in end-to-end or in reverse end-to-side fashion (fig 3).

Conclusions
As expected the radial sensate dorsal branches to the 1st space are capable to reach the deep motor branch of the ulnar nerve in palm and it is possible to perform a comfortable coaptation. Furthermore a smaller diameter, as well as fascicular cross-sectional area, fewer fascicles and axons, and a smaller axon density were found in the donor radial sensate branch compared to the recipient ulnar nerve branch. However, a ratio of 1:5.7 was found, which identifies the sensate branches of the radial nerve as potential good fiber donors to the ulnar motor branch in the palm even if, in literature, the donor-to-recipient fiber count ratio to identify a successful nerve transfer is known as 1:3.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

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