

THE ANATOMY OF THE UPPER AND LOWER EXTRIMITIES PERIPHERAL NERVES AS A
SOURCE OF NERVE ALLOGRAFTLee MK¹, So JW¹, Lee SR¹, Lee JJ², Shin SH², Chung YG²¹Department of R&D, Korea Public Tissue Bank, Seoul, Republic of Korea²Department of Orthopaedic Surgery, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Republic of Korea

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SUMMARY

Introduction: If the gap of the injured peripheral nerve is large, surgical treatment using auto-nerve transplantation, artificial or venous conduit interposition or allo-nerve grafting is necessary. Recently, there have been many studies on decellularized nerve allograft. Nerve allografts with 1~5 mm in diameter and 10~70 mm of length have been developed and applied to the clinical cases already. We evaluated whether the saphenous nerve and sural nerve of the lower extremities have sufficient length of 1~3 mm in diameter for development of nerve allograft. In addition, we tried to find other human nerves in upper and lower extremities which can provide various diameter and length of nerve grafts for reconstruction. **Materials:** Diameters and lengths of the median nerve, ulnar nerve, tibial nerve, and lateral femoral cutaneous nerve were measured in the donors of human tissue (n=22). Radial nerve in the upper limb was excluded due to the anatomical characteristics of many branching and easily damaged during retrieving. The total length of the median nerve and ulnar nerve was measured from the axillary fold to the ulnar head, and to the branch of the median nerve located about 5 cm distal from the cubital fold. The diameters of proximal and distal ends of median nerve and ulnar nerve were measured. The total length of the lower extremity tibial nerve was measured as the length from the vastus lateralis ridge of the greater trochanter to the lateral malleolus, and the branch to the sural nerve was measured as the knee joint point. The diameter of the tibial nerve was measured at proximal, distal, and immediately after sural nerve branch. The length of the lateral femoral cutaneous (LFC) nerve was measured from the ASIS to the branching point and the diameter was measured at the midpoint. **Results:** The total length of the upper extremities nerve was 419.0 ± 57.6 mm, the branch of the median nerve was located at the point of 251.7 ± 53.6 mm, the diameter of median nerve was 3.8 ± 0.7 mm at proximal end, 3.4 ± 0.7 mm at distal end, the diameter ulnar nerve was 3.1 ± 0.5 mm at proximal end, 2.7 ± 0.5 mm at distal end. The total length of the lower extremities tibial nerve was 744.9 ± 61.8 mm, the branch to the sural nerve was located at the point of 396.1 ± 38.2 mm. The diameter of tibial nerve was 5.0 ± 0.7 mm at proximal, 4.4 ± 0.8 mm after the sural nerve branch, and 3.7 ± 0.6 mm at distal. The length of LFC nerve was 159.7 ± 44.0 mm and the diameter was 1.1 ± 0.3 mm. **Discussion & conclusion:** There were differences in diameters between the upper and lower parts of the various nerves, we confirmed that the nerves of 1~5 mm in diameter and at least 70 mm of length can be obtained for development of nerve allograft. The measured nerves were confirmed to be usable as a graft.