

Optimal Placement of Needle EMG Electrode for Biceps Femoris Short Head: a Cadaveric Study

Dong Hwee Kim^{1*†}, Jong Heon Park¹, Ha Kyoung Lim¹, Jae Hyun Cha¹, Ki Jun Shin¹, Hong Bum Park², Dasom Kim², Im Joo Rhyu¹

Korea University Ansan Hospital, Department of Rehabilitation Medicine¹, Korea University College of Medicine, Department of Anatomy

Optimal Placement of Needle EMG Electrode for Biceps Femoris Short Head: a Cadaveric Study Dong Hwee Kim, Jong heon Park, Ha kyoung Lim, Jae hyun Cha, Ki jun Shin, Dasom Kim,* Im Joo Rhyu,* Department of Physical Medicine & Rehabilitation, Korea University College of Medicine * Department of Anatomy, College of Medicine, Korea University

Objectives

Needle electromyographic examination of biceps femoris short head muscle should be considered in differentiating common peroneal neuropathy around knee from proximal lesion such as sciatic neuropathy. Several techniques for needle EMG of the BFS muscle have been proposed. Most of Methods suggest medial or lateral approach to the tendon of biceps femoris long head around popliteal fossa. However, considering close approximation between common peroneal nerve and the tendon of biceps femoris long head, medial approach would be dangerous as the needle penetrate the nerve. The purposes of this study is to assess the optimal placement site for electromyographic examination of biceps femoris short head muscle through cadaver dissection. .

SUBJECTS AND METHODS

Twenty-one lower legs from 12 fresh cadavers were dissected. We performed dissection from ischial tuberosity to knee. The distance from the lateral margin of common peroneal nerve to the biceps femoris long head tendon (BFL_CPN distance) at 5 cm proximal to the tip of fibular head (P1), 4 finger breadths proximal to the tip of fibular head (P2, 7 cm), upper apex of popliteal fossa (P3), midpoint of biceps femoris short head (P4) (minus values, if, measuring point lied lateral to BFL tendon). Relative location of biceps femoris short head or long head to the biceps tendon was checked. .

RESULTS

The median values (minimum-maximum) of BFL_CPN distance were +2.0mm (-5.0 ~ 10.0) at P1, 3.0mm (-6.0+13.0) at P2, +0.0mm (-12.5 ~ 42.0) at P3, 0.0mm (-15.0 ~ 16.5) at P4 level. Overall, the CPN courses in proximity to the medial margin of the BFL tendon. Biceps femoris short head muscle was located lateral to the tendon of biceps femoris long head, biceps femoris long head muscle, medial side to the tendon of biceps femoris long head (unipennate type).

CONCLUSION

The medial approach of needle electrode for electromyographic examination of biceps femoris short head would have high risk of injury to the common peroneal nerve. Considering lateral location of biceps femoris short head muscle, lateral approach would be strongly recommended for electromyographic examination of this muscle.

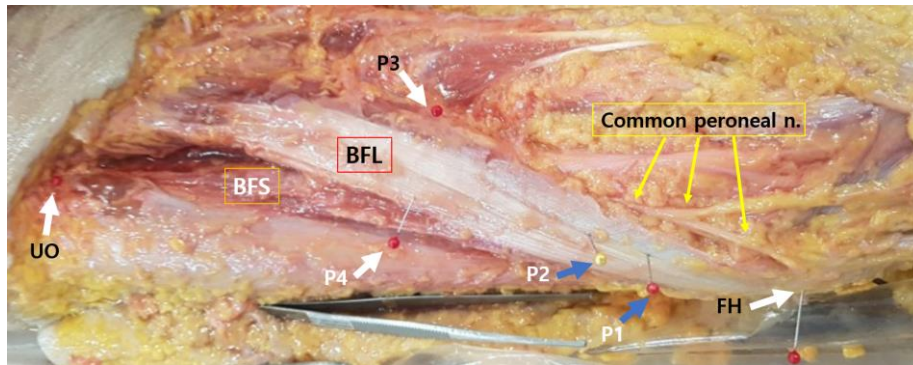


Fig 1. Anatomic relationship of common peroneal nerve, biceps short head and long head muscles to the tendon of biceps femoris long head.