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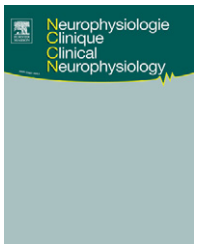

ORIGINAL ARTICLE/ARTICLE ORIGINAL

The two sensory branches of the superficial peroneal nerve: Electrophysiological differences and correlations with gender, age, height and BMI

Évaluation électrophysiologique comparée des deux branches sensitives du nerf péronier superficiel en relation avec le sexe, l'âge, la taille et l'index de masse corporelle

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KEYWORDS
Peroneal nerve;
SNAP amplitude;
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Norms

Summary
Aims of the study. — To detect amplitude differences between the sensory nerve action potentials (SNAP) obtained by simultaneous recording of the two main branches of the superficial peroneal sensory nerve (SPSN), the medial and intermediate dorsal cutaneous sensory nerves (MDCN, IDCN); to investigate whether these differences, if any, are correlated with gender, age, body mass index (BMI), and height of normal subjects; to discuss their clinical significance.
Population and methods. — Seventy-six healthy volunteers (36 males) were included (mean age: 36.5 years, range 20—80). Simultaneous MCND and IDCN recordings were performed via surface electrodes placed at precise positions on the intermalleolus line. Stimulation was performed 14 cm proximally on two different sites over the anterolateral aspect of the right leg.
Results. — Responses were obtained for both nerve branches in all subjects. Median value and lower normal limit for the amplitude of the greater among both MDCN and IDCN responses was 10.95 μV and 4.9 μV, respectively. Statistically significant differences were found between the two branches in median amplitude and frequency of the greater value. These differences were not correlated with gender, age, BMI, or height.
Conclusion. — We propose simultaneous recording of the two main branches of the superficial peroneal sensory nerve, placing the recording electrodes and stimulation device on precise positions and measuring the amplitude of the best of both responses. This method is an improvement

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of an already existent one, and may be clinically useful in detecting abnormal responses of the SPSN.

MOTS CLÉS
Nerf musculocutané ;
SNAP ;
Nerf cutané dorsal interne ;
Nerf cutané dorsal moyen ;
Normes

Résumé
But. — Au moyen d'un enregistrement simultané, vérifier s'il existe des différences d'amplitude entre les potentiels d'action sensitifs (SNAP) des deux branches majeures du nerf musculocutané (SPSN), le nerf cutané dorsal interne (MDCN) et le nerf cutané dorsal moyen (IDCM) ; vérifier si ces différences sont, le cas échéant, corrélées avec le sexe, l'âge, l'index de masse corporelle (IMC) et la taille de sujets normaux ; discuter leur signification clinique.
Population et méthodes. — Les SNAP de 76 sujets normaux (36 hommes) d'un âge moyen de 36,5 ans (20—82 ans) ont été enregistrés simultanément au moyen d'électrodes de surface placées à des endroits précis de la ligne intermalléolaire. Les stimulations étaient appliquées 14 cm proximalement en deux positions transversales différentes de la face antéro-externe de la jambe droite.
Résultats. — Des SNAP ont été obtenus en regard des deux branches pour tous les sujets. La valeur médiane et la limite inférieure de la normale de l'amplitude du plus ample des deux SNAP obtenus sur les MDCN et IDCN de chaque sujet étaient de 10,95 μV et 4,90 μV respectivement. Des différences statistiques significatives ont été retrouvées entre les deux branches pour l'amplitude médiane et la fréquence de la valeur dominante. Ces différences n'étaient pas corrélées avec le sexe, l'âge, le IMC ou la taille.
Conclusions. — Il est proposé d'enregistrer simultanément les deux branches du musculocutané par placement des électrodes de stimulation et de détection à des points précis et de mesurer l'amplitude de la meilleure des deux réponses. Cette méthode, qui constitue une élaboration d'une technique connue, permet d'améliorer la spécificité des anomalies des réponses du SPSN.

Introduction

There is an obvious need for an additional sensory nerve conduction study in the lower extremity to supplement the information from sural-nerve studies. Therefore, the superficial peroneal sensory nerve (SPSN) has been the subject of several electromyographic investigations [3—6,10]. However, SPSN nerve conduction techniques have not gained widespread acceptance. Moreover absent SPSN responses were reported in normal subjects, questioning their reliability for electrodiagnosis.

In this article, we will present a technique evaluating in normal subjects the sensory nerve action potentials (SNAP) simultaneously recorded over both major branches of SPSN, that is, the medial dorsal cutaneous nerve (MDCN) and the intermediate dorsal cutaneous nerve (IDCN). Their amplitudes will be compared in each individual. We will look for possible correlations with sex, age, body mass index (BMI), and height.

Subjects and methods

We included 76 healthy volunteers, 33 males, mean age 36.5 (range 20—80), free from any symptoms or signs of peripheral neuropathy, and without history of diseases that might affect the peripheral nervous system such as diabetes, thyroid gland dysfunction, alcohol abuse, hepatitis, chronic kidney disease.

Simultaneous recording of the SNAPs of the two major branches of the SPSN were performed at the level of the ankle joint via two pairs of surface disk AgCl-Ag electrodes, diameter 8 mm. The ground electrode was positioned between the stimulating and recordings electrodes. Landmark sites for the recording electrodes were on the line connecting lateral and medial malleolus, just laterally to the tendon of the ''extensor digitorum longus'' (EDL) and ''extensor hallucis longus'' (EHL), for the right IDCN and MDCN, respectively. If there was no space between the tendons of both muscles, the EHL tendon was used for the MDCN. In the ankle, the EHL tendon lies laterally to the ''tibialis anterior'' tendon, approximately 28 mm from the medial malleolus. The space between the EHL and the EDL ranges from −2 to 11 mm [12]. The reference electrodes were placed 3 cm distally on the lines connecting the recording electrodes with the I-II and III-IV interdigital space, respectively.

The nerve was stimulated antidromically on the anterior lateral aspect of the leg, approximately at the proximal part of the distal third of the leg. The distance between the ankle and the site of stimulation for each individual subject was increased or decreased for the long and short legs respectively in order to find the best point for stimulating the SPSN nerve just after its cutaneous branch perforates the crural fascia. Stimulation was then performed over two different sites, a medial one and a lateral one 4.5 and 6 cm lateral to the anterior margin of the tibia, respectively (Fig. 1).

Skin temperature was maintained above 30 °C at the midportion of the lateral lower third aspect of the leg. Signal averaging of 5—10 responses was used for both SNAPs. Distal latency was calculated to the first positive wave of the SNAP, or, when this was not clear, to the point of deflection from the baseline (take off of the negative wave). This was used for the measurement of the sensory conduction velocity. SNAP amplitude was calculated as the difference