

原著論文

アキレス腱断裂経験者における断裂経験脚のアキレス腱の弛みと力学的特性

Achilles tendon slack and mechanical properties of the Achilles tendon in patient of unilateral Achilles tendon rupture

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Abstract

Patients who have repaired an Achilles tendon (AT) rupture potentially possess a high risk for re-rupture. The purpose of this study was to examine the mechanical properties of the rupture-experienced AT. Eight subjects participated in this study. They had undergone surgical repair of a unilateral AT rupture within the past 1-2 years. The fascicle length and angle of medial gastrocnemius muscle (MG) as well as the AT length and its cross-sectional area ( $CSA_{AT}$ ) were measured for the rupture-experienced leg ( $LEG_{ATR}$ ) and non-ruptured leg ( $LEG_{NOR}$ ) using ultrasonograph. In addition, the AT mechanical properties during the passive dorsiflexion were also measured for both legs. The AT length and  $CSA_{AT}$  were longer and greater in  $LEG_{ATR}$  than in  $LEG_{NOR}$ , respectively. Although AT force (ATF) was smaller in  $LEG_{ATR}$  than in  $LEG_{NOR}$  during the passive dorsiflexion, the AT strain was greater in  $LEG_{ATR}$  than in  $LEG_{NOR}$ . These results suggest that the repaired AT can be low young's modulus with slacking. This may cause overstrain of the repaired AT during dynamic exercises.

キーワード：アキレス腱断裂，スティフネス，弛み，超音波

Achilles tendon rupture, stiffness, slack, ultrasound

緒言

ランニングやホッピングジャンプなどの身体運動中、アキレス腱（以下「AT」と略す）にはモーメントアームの影響によって体質量の5倍から10倍の負荷が繰り返し加わる（Fukashiro et al., 1995；Komi 1992）。それゆえ、ATは炎症や断裂などの傷害が発生しやすい部位として

知られ、これらの傷害はアスリートのみならず一般人にも起こりうる（Józar and Kannus, 1997）。特にAT断裂では、アスリートや一般人に関係なく再断裂のリスクはおおよそ10%と、高い再断裂リスクを示しており（Wong et al., 2002）、AT再断裂のリスク要因を探る研究が注目されている。

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