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Evaluation of Achilles tendon oxygen saturation in patients with tendon rupture

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ABSTRACT

Introduction: Histopathological analyses of ruptured tendons show hypoxia-related tissue degeneration. Intrinsic factors that may cause tissue hypoxia, especially during physical exercise, may be related to Achilles tendon ruptures. Thus, the objective of the present study is to compare the resting oximetry of patients who had a ruptured Achilles tendon with that of a control group after exercise and after muscle ischemia.

Methods: This was a single-center, comparative, cross-sectional observational study approved by the research ethics committee. The study assessed the Achilles tendon oxygen saturation of 2 groups: patients with a history of total Achilles tendon rupture (R: n=12) and control individuals without a history of tendon rupture (C: n=11). Oxygen saturation was measured by infrared spectroscopy on a near-infrared spectroscopy (NIRS) device (PortaMon, Artinis Medical Systems). Data were collected after the patient had rested at least 10 minutes in the supine position at the following times: test, after controlled contractions of the triceps surae muscle, and after 5 minutes of leg ischemia. The NIRS sensor was placed on the contralateral Achilles tendon in group R or on a randomized limb in group C. Data normality was confirmed using the Shapiro-Wilk test, and the groups were compared using the independent samples t test, with a significance level of $p < 0.05$.

Results: The oximetry levels of group R were similar to those of group C at rest (R: $72 \pm 9\%$ vs. C: $74 \pm 6\%$, $P = 0.598$), after exercise (R: $74 \pm 5\%$ vs. C: $77 \pm 4\%$, $p = 0.199$), and after 5 minutes of ischemia (R: $79 \pm 3\%$ vs. C: 80 ± 5 , $p = 0.856$).

Conclusion: No differences in Achilles tendon oxygen saturation were identified between individuals with a history of rupture and control individuals.

Keywords: Achilles tendon; Oximetry; Hypoxia.

