

EARLY ANKLE MOTION AFTER SURGICAL REPAIR OF ACUTE ACHILLES TENDON RUPTURE

¹Viviane Frasson, ¹Rafael Ott, ¹Valdirene Silva, ¹Mayra Nova, ¹Felipe Cibils, ²Alexandre Mayer,

¹Denizar Melo, ²Marco A. Vaz; e-mail: marcovaz@esef.ufrgs.br

¹Pontific Catholic University of Rio Grande do Sul, Porto Alegre, RS, Brazil

²School of Physical Education, Federal University of Rio Grande do Sul, Porto Alegre, RS, Brazil

INTRODUCTION

The incidence of acute Achilles tendon rupture is in the order of 18 ruptures/100.000 people [1]. Surgical treatment is usually followed by six weeks of immobilization. Early ankle joint mobilization seems to prevent usual complications related to long-term immobilization, but may present a risk for the tendinous suture. Protocols designed for the gain in dorsiflexion range of motion (ROM) have not been found in the literature [2]. The purpose of this study was to develop a new methodology for dorsiflexion ROM gain in patients subjected to surgical repair after acute Achilles tendon rupture.

METHODS

Seven patients subjected to surgical repair of the Achilles tendon remained with a removable cast (Robofoot) for 15 days. After immobilization, patients were submitted to 6 weeks of physical therapy of ankle plantar- and dorsiflexion to gain ROM. The protocol consisted of physiotherapy sessions 3 times per week, with 2 series of 15 repetitions of active dorsiflexion and 2 series of passive dorsiflexion. Immediately after the tendon surgical repair, maximal passive force was determined with an isometric dynamometer (Baseline, USA) that was pressed against the foot plant. At the first sign of tension on the suture the surgeon interrupted the pressing of the dynamometer against the foot and the passive tension was registered. This tension was applied weekly in the physical therapy protocol, and the maximal dorsiflexion ROM was registered. The dynamometer was used in the beginning of each week to guarantee that the tension determined after surgery was not surpassed in the first four weeks of rehabilitation. The passive dorsiflexion ROM obtained during the dynamometer measurements in the beginning of each week was measured with a goniometer and used as the limiting factor for the dorsiflexion exercise in the following two rehabilitation sessions. In the last two weeks of physiotherapy the ROM was limited to the patients maximal ROM. The patients active ROM were evaluated at 15, 45 and 60 days post-surgery by asking patients to actively dorsiflex the ankle up to their maximum dorsiflexion amplitude.

RESULTS AND DISCUSSION

The average passive force applied to the foot plant immediately after tendon suture was 4.8 ± 1.18 Kgf (mean and SD; range 3.5-7.5 Kgf). There was an increase in the dorsiflexion ROM from week 1 to week 5 of physiotherapy remaining about constant from week 5 to week 7 (Figure 1). These results show that a constant applied load increases passive dorsiflexion ROM up to 5 weeks. Further increases in ROM seem to need a higher passive force, as there was no increase in ROM from week 5 to week 7. There was an increase in the active ROM in the injury side with training from 15 to 45-60 days post-surgery ($p < 0.001$). No

differences were observed in the ROM from 45 to 60 days. Also, no differences were observed in the non-operated side ($p = 0.134$; Figure 2). No differences were observed between sides 60 days post-surgery ($p = 0.171$), showing recovery of the patients active ROM only at this time period.

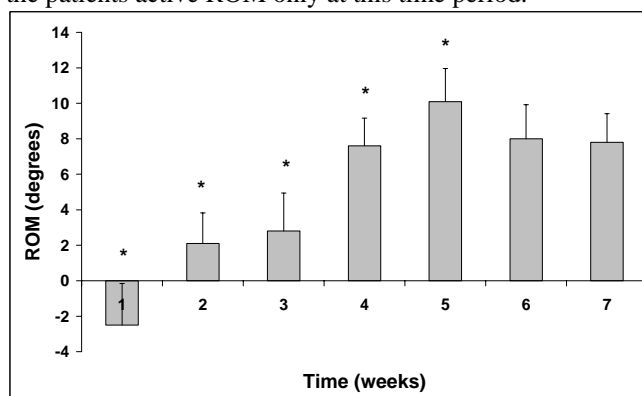


Figure 1. Passive dorsiflexion ROM obtained at the 6 weeks of physiotherapy. Number 7 represents the measurement at the end of the treatment (end of 6th week). $* = p < 0.05$.

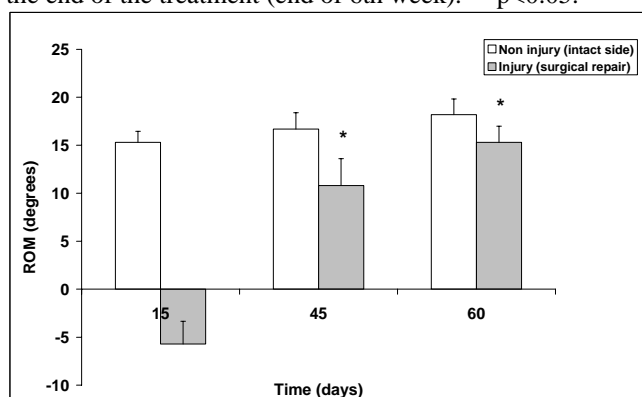


Figure 2. Active dorsiflexion ROM obtained at 15, 45 and 60 days post-surgery. $* = p < 0.05$.

CONCLUSIONS

The physical therapy protocol produced an increase in the passive dorsiflexion ROM with no risk for the tendinous suture in the first 5 weeks of therapy. An increase in the passive force applied to the foot is necessary to increase the passive dorsiflexion ROM. The active dorsiflexion ROM returned to control values only at 6 weeks post-surgery. This suggests that 6 weeks of passive training is necessary to regain passive and active dorsiflexion ROM.

ACKNOWLEDGEMENTS

Financial support by FINEP-Brazil.

REFERENCES

1. Leppilahti J, et al. *Acta Orthop. Scand.* **67**:277-279, 1996.
2. Suchak AA, et al. *Clin. Orthop. Rel. Res.* **445**:216-221, 2006.