

Evaluation of Brake Response Time Following Primary Achilles Tendon Repair Surgery

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Introduction/Purpose: Although surgical repair of Achilles tendon ruptures are common procedures, there are no studies investigating postoperative driving safety in these patients. Active contracture of the Gastroc-soleus-Achilles mechanism is required during a braking maneuver while driving. There is concern that these patients may be hesitant to rapidly apply braking pressure, putting themselves and others at potential risk. The purpose of this study was to evaluate postoperative brake response time (BRT) in right-sided Achilles rupture repair patients as a means to determine driving preparedness. BRT is defined as the time, in milliseconds, between presentation of a perceived hazardous stimulus and the application of pressure to the brake pedal in a driving simulator model. We hypothesized patients would demonstrate BRTs comparable to control subjects 6-week after repair.

Methods: Following IRB approval, 50 right-sided acute primary Achilles rupture repair patients were prospectively identified and enrolled. All patients were managed with a standardized postoperative protocol. Exclusion criteria were age under 18, those not in possession of a valid driver's license, those undergoing non standard open primary repair, and those declining to participate in the study. All patients were tested for their BRT utilizing a validated driving simulator at their 6-week postoperative follow-up appointment. Those patients that failed to achieve a safe brake response time less than 0.850 seconds were re-tested at weekly intervals until a safe breaking time was achieved. The passing brake response time of 0.850 seconds was determined from the published control data and from testing 20 healthy volunteers in the same simulator. At each testing, patients also filled out an AOFAS Ankle Hindfoot Scale, an Achilles Tendon Total Rupture Scale (ATRS) Questionnaire and a Driving Preparedness survey.

Results: Each subject underwent 3 sequential drive-braking simulation tests, with their BRT being calculated as an average of the 3 times. At six weeks post repair the overall average BRT for all 50 patients was 0.658 seconds. 47 of the 50 patients (94%) demonstrated safe average BRT at their 6-week post operative testing of equal to or less than 0.850 seconds, with the remaining 3 patients achieving a safe BRT after 7 weeks. All 47 patients whose test demonstrated a safe BRT at 6 weeks responded in their survey that they "Agreed" or "Strongly Agreed" they were ready to drive at the time of testing. At six weeks post repair, the average AOFAS-AH score was 78.7/100, and the average ATRS score was 54.0.

Conclusion: The present study revealed that 94% of primary right-sided acute Achilles tendon rupture repair patients were able to demonstrate a safe BRT comparable to those of healthy control subjects 6 weeks after their surgical procedure, and all by seven weeks following surgery. 100% of these patients also reported that after completing the test, they felt ready to return to driving. Therefore, we believe that it is reasonable to offer primary Achilles tendon repair patients an estimate of 6-weeks recovery time before driving.