Chang YP(張逸平), Chiang H, Shih KS, Ma HL, Lin LC, Hsu WL, Huang YC, Wang HK(王興國). Effects of therapeutic physical agents on achilles tendon microcirculation. Journal of Orthopaedic & Sports Physical Therapy 2015;45(7):563-9

Study design: Controlled laboratory study. **Objectives:** To measure Achilles tendon microcirculation (total hemoglobin [THb] and oxygen saturation [StO2]) before and after the application of a physical agent in asymptomatic participants, and to compare differences between application location and physical agent dosage. **Background:** Tendon microcirculation can be altered by superficial heating or cryotherapy. **Methods:** Fifty-one healthy adults (median age, 22 years; range, 20-34 years) were recruited and randomly assigned into 1 of 4 groups. Participants in each group received an intervention consisting of 1 of the following 4 physical agents: ultrasound (n = 12), interferential current (n = 14), low-level laser (n = 11), or vibration massage (n = 14). In each group, the selected intervention was applied at 2 different doses (ultrasound, 0.8 or 1.2 W/cm^2; laser, 5.4 or 18 J) or target locations (vibration and electrostimulation, calf muscle or Achilles tendon). For each participant, each dose or target location was randomly applied to 1 randomly selected lower leg (each leg receiving only 1 of the 2 options). **Results:** The StO2 values significantly increased after ultrasound at both doses (P<.008), and the THb value significantly increased for the higher dose only (P<.008). Both THb and StO2 values also significantly increased in response to vibration massage targeting the Achilles tendon (P<.008), and these values were greater than those resulting from the vibration massage applied to the calf muscle (P = .003 and .002, respectively). No significant THb and StO2 differences were found after the application of interferential current or low-level laser. **Conclusion:** Tendon microcirculation increases after ultrasound and vibration massage intervention concentrated on the Achilles tendon. These modalities may be considered for the purpose of temporarily increasing microcirculation in the tendon.