

# Nicotine Dependence is Associated with Increased Rates of Postoperative Complications in Achilles Tendon Repair: A Propensity Matched Comparison

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**Introduction:** Nicotine is a modifiable risk factor that is well demonstrated to cause deleterious effects on tendon healing and overall health. Individuals that have a dependence on nicotine may be at an elevated risk for numerous postoperative complications when compared to non-dependent patients. The purpose of this study is to evaluate the complications postoperatively between nicotine and non-nicotine dependent Achilles Tendon Repairs.

**Methods:**

*Design:* In this retrospective cohort study, TriNetX was used to evaluate de-identified patient information from 49 healthcare organizations (HCOs) and over 93 million patients on the network in the United States.

*Participants:* Two cohorts were evaluated for this study. Achilles Tendon Repair was defined as a primary open or percutaneous repair (CPT:27650), or secondary repair with or without a graft (CPT:27654). Cohort A was defined as patients that had an Achilles Tendon Repair and had a dependence to nicotine (ICD10:F17). Cohort B was defined as patients that had an Achilles Tendon Repair but did not have a dependence to Nicotine. Patients with diabetes mellitus, gout, rheumatoid arthritis, and lupus were excluded from the analysis. Cohorts were propensity matched for demographic factors, such as, age at event, ethnicity, race, and sex.

*Setting:* Data was gathered from HCOs from May 18th, 2003, to May 18th, 2023. The outcomes evaluated were: wound disruption, infection following a procedure, mononeuropathy of lower limb, reduced mobility, sepsis, deep vein thrombosis, atrophy, acute postoperative pain, pneumonia, Achilles tendon strain, and pulmonary embolism. All postoperative complications were analyzed between 1 day and 5 years after the Achilles Tendon Repair.

**Results:** A total of 1,435 nicotine dependent patients were matched with 14,056 non-nicotine dependent patients. Nicotine dependent patients that underwent Achilles Tendon Repair experienced increased risk for numerous postoperative complications. Nicotine dependent patients had increased risk for wound disruption (RR 1.47, 4.455% vs 3.041%, p = 0.0477), infection following a procedure (RR 1.7, 3.607% vs 2.122%, p = 0.0179), mononeuropathy of the lower limb (RR 1.93, 3.96% vs 2.051%, p = 0.0029), sepsis (RR 2.1, 1.485% vs 0.707%, p = 0.047), and pneumonia (RR 2.53, 2.68% vs 1.06%, p = 0.0014).

**Conclusion:** In the last 20 years (2003 to 2023), nicotine dependent patients that underwent Achilles Tendon Repair were associated with a significantly higher risk (p < 0.05) for postoperative complications than their non-nicotine dependent counterpart. Clinical trials specific to nicotine and its potential health hazards could better help clinicians further discuss and optimize their surgical management protocol.

**Significance/Clinical Relevance:** This study served as a marker to evaluate the impact of nicotine dependence on postoperative complications context of Achilles Tendon Repair. The association between nicotine dependence and increase risk for postoperative complications elucidates further necessity for clinicians to educate their patients to the hazard of smoking and other forms of nicotine utilization.

