

- Abstract No. : F-0014
- Category : Shoulder
- Detail Category : Rotator cuff , general

Smoking Cessation for Three Years Is Required to Achieve Retear Rates Comparable to Those of Nonsmokers Following Rotator Cuff Repair

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Introduction and Background

While smoking adversely affects rotator cuff healing, the temporal relationship between smoking cessation duration and repair outcomes remains poorly understood. Few studies have examined whether retear rates after arthroscopic rotator cuff repair decrease with longer cessation periods and at what cessation threshold outcomes approximate those of nonsmokers.

Material and Method

The study included 1,902 patients who underwent arthroscopic rotator cuff repair for full-thickness tears between March 2012 and October 2023. Patients were categorized as nonsmokers(1,172 patients), former smokers stratified by cessation duration of <1 year, 1-3 years, 3-5 years, and >5 years(454 patients), or current smokers(276 patients). After 1:1:1 propensity score matching based on age, employment status, tear size, and fatty infiltration, 276 patients per group were analyzed. The visual analog scale, subjective shoulder value, American Shoulder and Elbow Surgeons score, University of California at Los Angeles score, and range of motion were used to compare functional outcomes. Six-month postoperative magnetic resonance imaging assessed structural integrity using the Sugaya classification.

Results

At the two-year follow-up evaluation, clinical scores and range of motion had significantly improved($p < 0.001$ for all) in all groups without significant intergroup differences. However, retear rates differed significantly: 17.0% in nonsmokers, 23.2% in former smokers, and 27.5% in current smokers($p = 0.005$). Former smokers demonstrated progressively decreasing retear rates with longer cessation: 28.6% at <1 year, 27.0% at 1-3 years, 20.1% at 3-5 years, and 19.4% at >5 years. Patients with ≥ 3 years cessation achieved rates comparable to nonsmokers. Multivariable analysis identified smoking status, pack-years(cutoff: 14), and cessation duration(cutoff: 44 months) as independent predictors. The combined cessation-duration/pack-year model demonstrated superior predictive performance(AUC = 0.716).

Conclusions

Sustained smoking cessation significantly lowers retear rates after rotator cuff repair, with at least 3 years of abstinence required to achieve rates comparable to those of nonsmokers. Pack-years and duration of cessation serve as independent predictors of tendon healing.

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KSES 2026

The 33rd Annual
International Congress of the
Korean Shoulder and
Elbow Society

March
27(Fri) ~ 28(Sat), 2026
BEXCO, Busan, Korea

Figure & Table 1.

