Long-term Outcomes and Conversion Rates to Total Hip Arthroplasty Following Hip Arthroscopy for Femoroacetabular Impingement Syndrome in Patients with Mild Osteoarthritis: A Propensity-Matched Cohort Analysis

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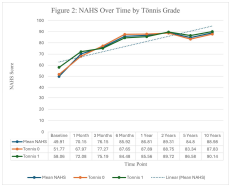
INTRODUCTION:
Femoroacetabular impingement syndrome (FAIS) is a well-recognized source of hip pain and dysfunction in young to middle-aged adults. Hip arthroscopy has become the gold standard surgical treatment, demonstrating reliable improvements in pain, function, and patient-reported outcomes (PROs). However, the presence of preoperative osteoarthritis has emerged as a potential contraindication to hip arthroscopy, due to associations with inferior outcomes and increased conversion to total hip arthroplasty (THA). Although patients with advanced degenerative changes are generally excluded from arthroscopic intervention, the impact of **mild osteoarthritis (Tönnis grade 1)** on long-term outcomes remains insufficiently studied. The purpose of this study was to evaluate 10-year clinical outcomes and survivorship following hip arthroscopy in patients with FAIS, comparing those with Tönnis grade 1 osteoarthritis to a matched cohort with Tönnis grade 0.
METHODS:
A retrospective review was conducted using a longitudinal database of patients who underwent hip arthroscopy for femoroacetabular impingement syndrome (FAIS) between 2010 and 2013. Patients with a minimum of 10-year follow-up were included. Tönnis grade was determined using preoperative radiographs. A 1:1 propensity score matching was performed based on age, sex, body mass index (BMI), and smoking status to compare patients with Tönnis grade 1 osteoarthritis to those with Tönnis grade 0. Clinical outcomes assessed included the modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), and achievement of the minimal clinically important difference (MCID). Failure was defined as revision hip arthroscopy or conversion to total hip arthroplasty (THA), and overall survivorship was evaluated at 10 years.
RESULTS:
A total of 64 patients were included, with 32 patients in each group. The Tönnis grade 1 cohort had a mean age of 40.79 ± 10.1 years and mean BMI of 25.13 ± 3.73 kg/m², while the Tönnis grade 0 group had a mean age of 41.82 ± 11.66 years and BMI of 25.63 ± 3.53 kg/m². There were no significant differences in baseline demographic characteristics between matched groups ($p > 0.05$ for all comparisons).
At 10-year follow-up, both cohorts demonstrated statistically significant improvements in mHHS and NAHS scores from baseline ($p < 0.0001$). Tönnis grade 1 patients improved from 49.97 ± 12.75 to 84.58 ± 19.09 (mHHS), and from 49.76 ± 13.29 to 87.48 ± 12.95 (NAHS). Tönnis grade 0 patients improved from 52.76 ± 14.79 to 89.16 ± 10.90 (mHHS), and from 52.55 ± 16.32 to 89.63 ± 12.07 (NAHS). There were no statistically significant differences in outcome scores between groups at any time point, including final follow-up ($p > 0.05$). Achievement of the MCID was also high across both groups. For the mHHS, MCID was achieved in 90.6% of Tönnis grade 1 patients and 87.5% of Tönnis grade 0 patients ($p = 1.00$). For the NAHS, MCID was achieved in 93.8% of Tönnis grade 1 patients and 87.5% of Tönnis grade 0 patients ($p = 0.67$).
The failure rate was significantly higher in the Tönnis grade 1 group, with 10 of 32 patients (31.25%) undergoing either revision arthroscopy ($n = 5$) or conversion to THA ($n = 5$), compared to only 1 of 32 patients (3.13%) in the Tönnis grade 0 group ($p = 0.006$). Kaplan-Meier survivorship at 10 years was 68.75% for Tönnis grade 1 and 96.87% for Tönnis grade 0 (log-rank $p = 0.0047$).
DISCUSSION AND CONCLUSION:
Hip arthroscopy yields significant long-term improvements for FAIS patients with and without mild osteoarthritis. However, decreased survivorship in Tönnis grade 1 patients suggests that preoperative osteoarthritis may predispose patients to greater rates of subsequent surgical intervention. These findings highlight the need for preoperative counseling regarding the increased risk of future THA in patients with mild radiographic osteoarthritis.



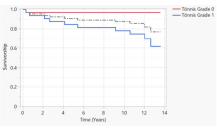


Table 1: Patient Baseline Characteristics

Tönnis Grade		Overall (n = 64)	Tönnis Grade 0 (n = 32)	Tönnis Grade 1 (n = 32)	P Value
Age (Years)		41.5 ± 10.85	41.82 ± 11.66	40.79 ± 10.1	0.789
BMI		25.38 ± 3.61	25.63 ± 3.53	25.13 ± 3.73	0.589
Smoking Status	Smokers	13 (20.31%)	7 (21.88%)	6 (18.75%)	0.756
	Nonsmokers	51 (79.69%)	25 (81.25%)	26 (81.25%)	
Sex	Female	40 (62.5%)	22 (68.75%)	18 (56.25%)	0.392
	Male	24 (37.5%)	10 (31.25%)	14 (43.75%)	
Follow up (Years)		11.79 ± 1.18	11.42 ± 1.23	12.16 ± 0.96	**0.009**

Table 2: Patient Outcomes by Tönnis Grade

Tönnis Grade		Overall (n = 64)	Tönnis Grade 0 (n = 32)	Tönnis Grade 1 (n = 32)	P Value
Baseline	mHHS	52.69 ± 13.62	53.48 ± 13.66	51.9 ± 13.74	0.645
	NAHS	50.03 ± 13.72	51.77 ± 15.74	48.24 ± 11.23	0.281
10 Year	mHHS	88.98 ± 13.84	87.83 ± 15.9	90.14 ± 11.56	0.509
	NAHS	87.13 ± 16.37	85.16 ± 19.7	89.1 ± 12.19	0.339
Met 10-Year mHHS MCID		57/64 (89.06%)	28/32 (87.5%)	30/32 (93.75%)	0.689
Met 10-Year NAHS MCID		58/64 (90.63%)	28/32 (87.5%)	29/32 (90.63%)	0.391
Conversion to THA		5/64 (7.81%)	0	5 (15.63%)	**0.05**
Time to THA (Years)		9.96 ± 2.86	NA	9.96 ± 2.86	NA
Revision Rate		6 (9.38%)	1/32 (3.13%)	5/32 (15.63%)	0.196
Time to Revision (Years)		0.72 ± 1.29	0.3	0.76 ± 1.34	0.75
Failure (THA / Revision)		11 (17.19%)	1/32 (3.13%)	10/32 (31.25%)	**0.006**
Time to Failure (Years)		5.45 ± 4.81	0.3	5.96 ± 4.74	0.384