Outcomes of Internal Brace Augmentation Alone Versus Broström Repair With Internal Brace for Chronic Lateral Ankle Instability: A Retrospective Comparative Study

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INTRODUCTION: Lateral ankle sprains are among the most frequently occurring musculoskeletal injuries in athletes in the United States. These injuries frequently involve disruption of the anterior talofibular ligament (ATFL), and while most resolve with conservative care, up to 40% of patients develop chronic lateral ankle instability (CLAI). For patients who fail nonoperative management, the Broström procedure remains the surgical gold standard. However, outcomes may be limited in individuals with generalized ligamentous laxity, poor tissue quality, or high functional demands. Internal brace augmentation, a high-strength suture tape construct that reinforces the ATFL, has gained popularity for its enhanced mechanical stability and potential to accelerate rehabilitation. However, the effectiveness of using an internal brace without formal ligament imbrication remains uncertain. This study evaluates 1 year postoperative outcomes in patients treated with either internal brace augmentation alone or the standard Broström repair with internal bracing.

METHODS: After IRB approval, we retrospectively reviewed all lateral ankle stabilization surgeries performed at a single academic center between January 2017 and December 2020. Adults 18-80 years old with chronic lateral ankle instability unresponsive to ≥ 6 months of conservative treatment were included, with diagnosis based on history, exam , and imaging when available. Patients were divided by surgical technique: (1) *Internal Brace Alone* suture-tape augmentation without ligament repair, and (2) *Broström + Internal Brace* anatomic repair with imbrication. Postoperative outcomes including satisfaction, persistent pain, instability, and revision were assessed at ≥1 year follow-up with the operating surgeon and analyzed as binary variables. Continuous data were analyzed with t-tests; categorical data with chi-square or Fisher's exact tests. Statistical significance was set at $p < 0.05$.

RESULTS: A total of 80 patients met inclusion criteria, with 58 (72.5%) undergoing Internal Brace Alone and 22 (27.5%) treated with Broström + Internal Brace. The mean age across both cohorts was 31.6 ± 14.4 years, comprising 27 males and 53 females. Baseline demographics, including age, sex, BMI, symptom duration, laterality, and comorbidity profiles were similar between groups ($p > 0.05$ for all). At a minimum follow-up of 12 months, both cohorts demonstrated high satisfaction rates, with no significant difference between the Internal Brace Alone group (87.5%) and the Broström + Internal Brace group (90.9%) (p = 0.67). Persistent ankle pain was reported in 32.7% of patients in the Internal Brace group compared to 22.7% in the Broström group (p = 0.38). Recurrent instability occurred in 6.9% versus 4.5% of patients, respectively (p = 0.70), while revision surgery was required in 12.1% of patients in the Internal Brace group compared to 4.5% in the Broström group (p = 0.32).

DISCUSSION: At 1-year follow-up, internal brace augmentation alone demonstrated comparable outcomes to the Broström procedure with internal brace reinforcement in the treatment of CLAI. Patient satisfaction, recurrent instability, revision rates, and pain were similar between groups, with no statistically significant differences. These comparable results may be attributed to the biomechanical design of the internal brace construct, which replicates the native orientation of the ATFL and counteracts inversion forces to provide immediate stability. Additionally, eliminating formal ligament repair may reduce soft tissue disruption and operative time, further contributing to preserved function and pain control.
Limitations: This retrospective, single-center study is limited by its small sample size, potential selection bias, and lack of standardized patient-reported outcomes. Surgical variability existed among multiple surgeons, though diagnostic criteria and rehabilitation protocols were consistent. Exclusion of patients undergoing additional procedures may limit generalizability to more complex cases.

Relevance/Clinical significance: This study contributes to the evolving landscape of operative strategies for chronic lateral ankle instability by comparing outcomes of internal brace augmentation alone to the traditional Broström repair with internal bracing. Given similar rates of satisfaction, pain, instability, and revision between groups, internal bracing alone may represent a viable surgical alternative, particularly for patients with compromised tissue quality or higher activity demands. These findings support broader consideration of internal bracing as a standalone option in appropriately selected cases, potentially offering a less invasive approach while preserving clinical efficacy.

Table 1. Demographics of the Patient Population

Patient Characteristics and Outcomes	Internal Brace (n = 58) Mean ± SD or n	Brostrom + Internal (n = 22) Mean ± SD or n	P value
Age, y	32.4 ± 14.6	29.5 ± 13.8	0.40
Sex			0.82
Female	38	15	
Male	20	7	
BMI	29.4 ± 6.3	29.3 ± 6.8	0.87
Laterality (number)			0.49
Right	24	21	
Left	24	16	

Table 2. Comorbidities in the Patient Population

	Internal Brace (n = 58)	Brostrom + Internal Brace (n = 22)	P Value (χ^2)
Overall Comorbidity	16	7	0.05
Smoking	12	6	0.039
Diabetes	3	1	0.04
Stroke	1	0	0.30

Table 3. Patients Receiving Isolated Internal Brace and Bostrom + Internal Brace Stratified by Surgical Outcome.

Outcome	Internal Brace (n = 56)	Brostrom + Internal Brace (n = 22)	P value
Patient Satisfaction	49	20	0.67
Ankle Instability	4	1	0.70
Ankle Pain	19	5	0.38
Revision Surgery	7	1	0.32