

# Capsular Repair Restores Axial Resistance to Distraction in Pediatric Hip Arthroscopy Patients: An *in vivo* Study



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I have no disclosures to report.

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# BACKGROUND

- Controversy currently exists surrounding the necessity of capsular repair following capsulotomy in patients undergoing primary hip arthroscopy.
- Previous studies have demonstrated that, in the adult population, capsulotomy decreases the hip joint's resistance to distractive forces in the axial direction, and that capsular repair restores this resistance to pre-capsulotomy, native-state levels.
- These phenomenon have not been studied in the pediatric population to determine whether they share similar distractive characteristics as their adult counterparts.

# PURPOSE

**The purpose of this study is to assess in the pediatric population whether capsulotomy compromises the hip joint's resistance to axial distraction, and whether capsular repair can restore this resistance to native state levels.**

# METHODS

- Patients undergoing primary hip arthroscopy by a single surgeon underwent intraoperative axial distraction testing.

## Inclusion Criteria

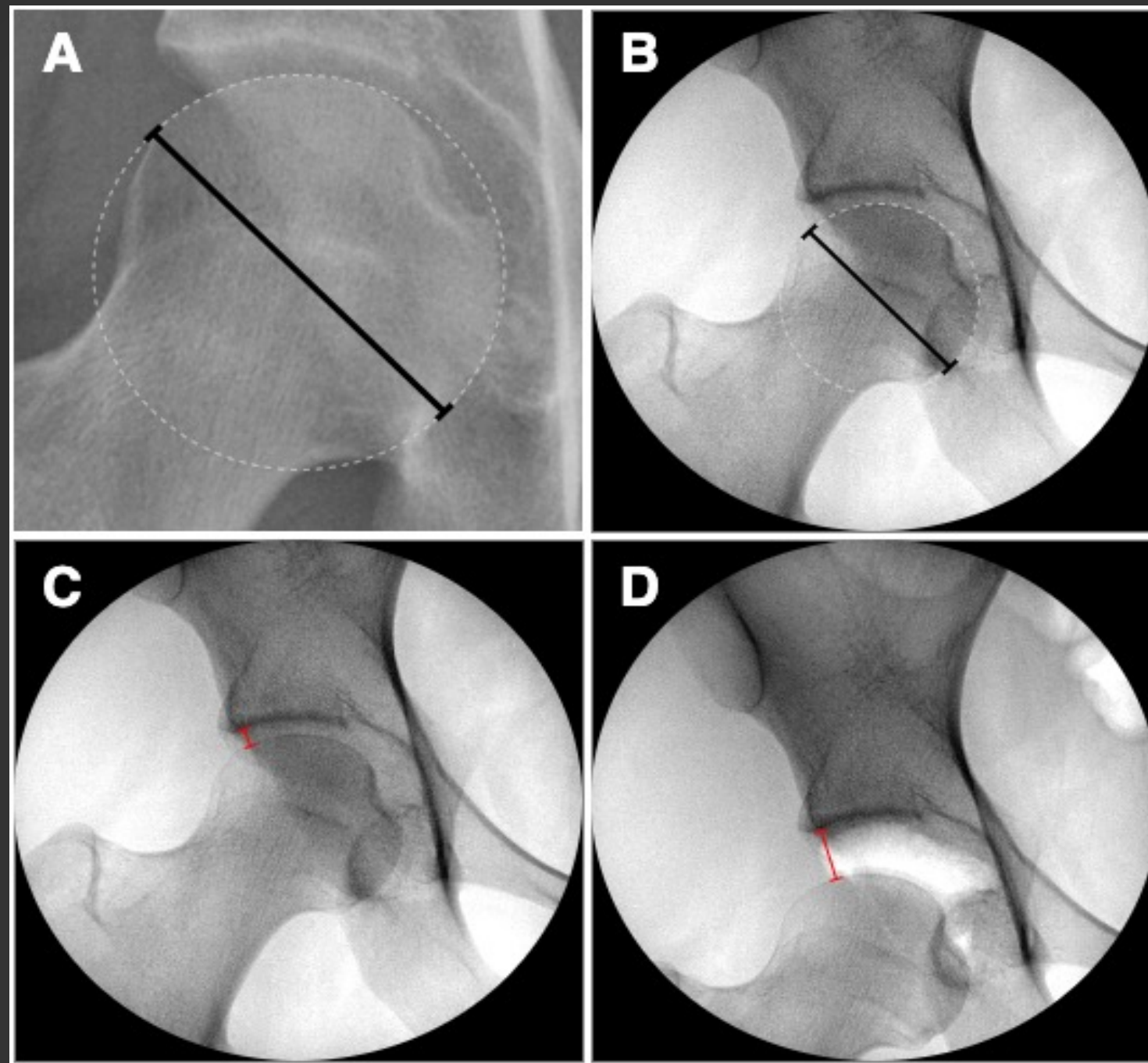
- 1) age < 18 years
- 2) successful completion of the study traction protocol
- 3) patients undergoing primary hip arthroscopy

## Exclusion criteria

- 1) a lack of preoperative imaging
- 2) any previous hip surgery.

# METHODS

- Axial distraction testing was conducted in the native, after interportal capsulotomy, and capsular repair state.
- Capsular repair was performed using figure-of-eight suturing.
- Axial distraction testing protocol consisted of intraoperative fluoroscopic imaging conducted at 0-, 25-, 50-, 75-, and 100- lbf of traction applied in the axial direction using a post-free hip distraction system.



Example of hip distraction protocol measurements. The diameter of the acetabulum is measured on a preoperative anteroposterior radiograph and the distance is used as a “known variable” to scale and calibrate intraoperative fluoroscopic imaging (A and B). Lateral joint space measurements are taken at 0-, 25-, 50-, 75-, and 100- lbs of axial distraction (C and D, only 0 and 100 lbf shown).

# RESULTS

**Table 1:** Baseline demographic and radiographic data of the study population.

<b>Variable</b>	<b>n = 32</b>
<i>Age</i>	16.43 (1.10)
<i>Range</i>	13.80 – 17.99
<i>BMI</i>	23.17 (4.36)
<i>Range</i>	18.9 – 39.0
<i>Sex, n (%)</i>	
<i>Female</i>	24 (75.1)
<i>Male</i>	8 (24.9)
<i>Operative Side, n (%)</i>	
<i>Left</i>	21 (65.6)
<i>Right</i>	11 (34.4)
<i>LCEA to bone edge</i>	32.8 (5.5)
<i>LCEA to <u>sourcil</u></i>	28.5 (5.6)
<i>Alpha angle</i>	58.6 (13.1)
<i>Beighton Score**, n (%)</i>	
<4	18 (56.3)
>4	4 (12.5)

\* All values reported as mean (standard deviation) unless otherwise specified.

\*\*Beighton score unavailable for eleven patients (31.3%)



**Table 2: Intra-operative distraction distances for three capsular states.**

Traction (lbs)	Distraction (mm)			
	Native State	Capsulotomy	$\Delta$	p-value
0	5.55	5.48	-0.07	0.086
25	5.59	5.74	0.15	0.320
50	6.28	7.81	1.53	0.002*
75	9.36	12.67	3.37	<0.001*
100	11.70	14.45	2.75	<0.001*
	Capsulotomy	Capsular Repair	$\Delta$	p-value
0	5.48	5.56	0.08	0.764
25	5.74	5.83	0.09	0.616
50	7.81	6.46	-1.35	0.045*
75	12.67	8.05	-4.62	<0.001*
100	14.45	10.18	-4.27	<0.001*
	Native State	Capsular Repair	$\Delta$	p-value
0	5.55	5.56	0.01	0.233
25	5.59	5.83	0.24	0.112
50	6.28	6.46	0.18	0.216
75	9.36	8.05	-1.31	0.094
100	11.70	10.18	-1.52	0.068

\*Significant at the 0.05 level

Capsulotomy resulted in increased distraction distances when compared to the native hip, and capsular repair restores the hip to native state biomechanics.

# DISCUSSION

- This study provides in-vivo biomechanical data suggesting that pediatric patients have similar distraction characteristics to adults when looking at the capsulotomy and capsular repair state.
- Capsulotomy resulted in increased distraction distances when compared to the native hip. After a complete capsular repair, the hip was restored to native-state distraction characteristics.

# CONCLUSION

**Capsular repair restores the hip to native state distraction biomechanics in the pediatric population. Therefore, capsular repair should be considered in this patient population.**

# Thank You



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