

Poster #94

Preoperative Brief Resilience Scale Score and Primary Anterior Cruciate Ligament Reconstruction

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Disclosures

- P.A.S. reports institutional grants, royalties, consulting fees, travel support, and patents, issued or pending, from Arthrex; speakers fees from Kairos Surgical and United Orthopedics; education committee, Arthroscopy Association of North America; and stock or stock options from Spinal Simplicity.
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Objective

To assess preoperative Brief Resilience Scale (BRS) scores as they relate to postoperative patient outcomes following primary autograft anterior cruciate ligament reconstruction (ACLR).



Patient Population

- Single-center, retrospective cohort study
- All skeletally mature patients who underwent primary autograft ACLR with suture tape augmentation (STA) by the senior author and completed a preoperative BRS survey from 2016 and 2021 were considered for this study



Brief Resilience Scale

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

1. I tend to bounce back quickly after hard times.....	1	2	3	4	5
2. I have a hard time making it through stressful events.....	1	2	3	4	5
3. It does not take me long to recover from a stressful event.....	1	2	3	4	5
4. It is hard for me to snap back when something bad happens.....	1	2	3	4	5
5. I usually come through difficult times with little trouble.....	1	2	3	4	5
6. I tend to take a long time to get over set-backs in my life.....	1	2	3	4	5

Scoring: The BRS is scored by first reverse coding items 2, 4, and 6 and then taking the mean of the all the items. Since the items are scored between 1 and 5, the mean you obtain would be between 1 and 5.

Fig. 1

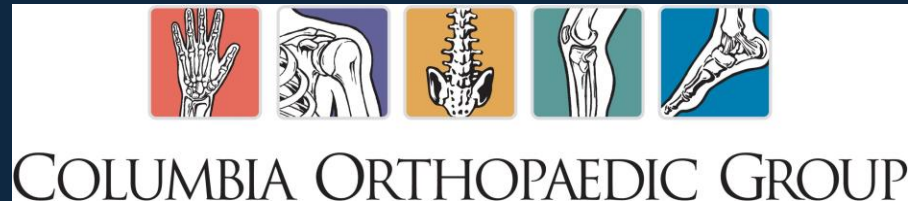
The BRS. (Reproduced with permission from Bruce W. Smith, PhD.)



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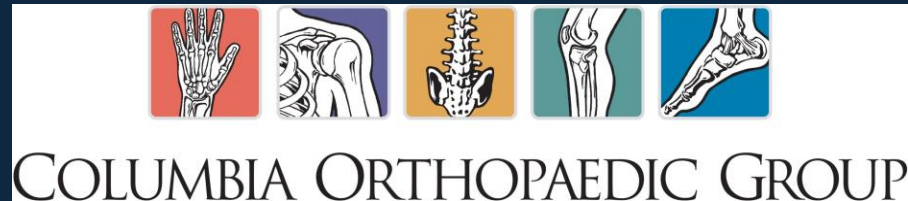
Other Subjective Outcomes

- Included validated PROs: International Knee Documentation Committee (IKDC) subjective, Lysholm Knee Survey & Tegner Activity Scale, Veteran's Rand 12-Item health Survey, Knee Injury and Osteoarthritis Outcome Score (KOOS), Single Assessment Numeric Evaluation (SANE), and Visual Analog Scale (VAS) for pain
- Return to sport was obtained from each patient



Objective Outcomes

- Operative details collected from senior author's operative reports
- Need for subsequent interventions obtained from each patient via EMR, telephone, or office visits
- Other outcome measures: KT-1000 arthrometer measurements and ROM

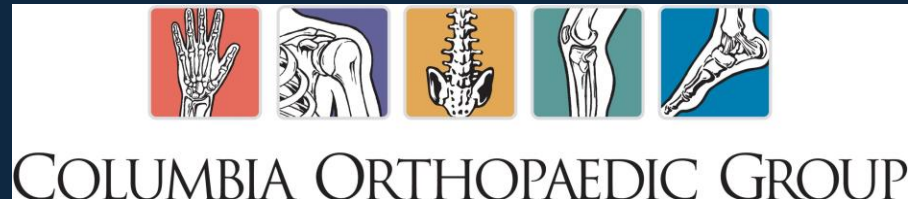


Surgical Technique

- For all-soft tissue grafts (quadriceps tendon & quadrupled semitendinosus hamstring tendon): proximal and distal ALDs were used
- For BTB grafts: proximal ALD was used, interference screw used distally through full tibial tunnel
- Suture tape fixed independently of the graft (tape looped through proximal ALD button and tacked distally with anchor)

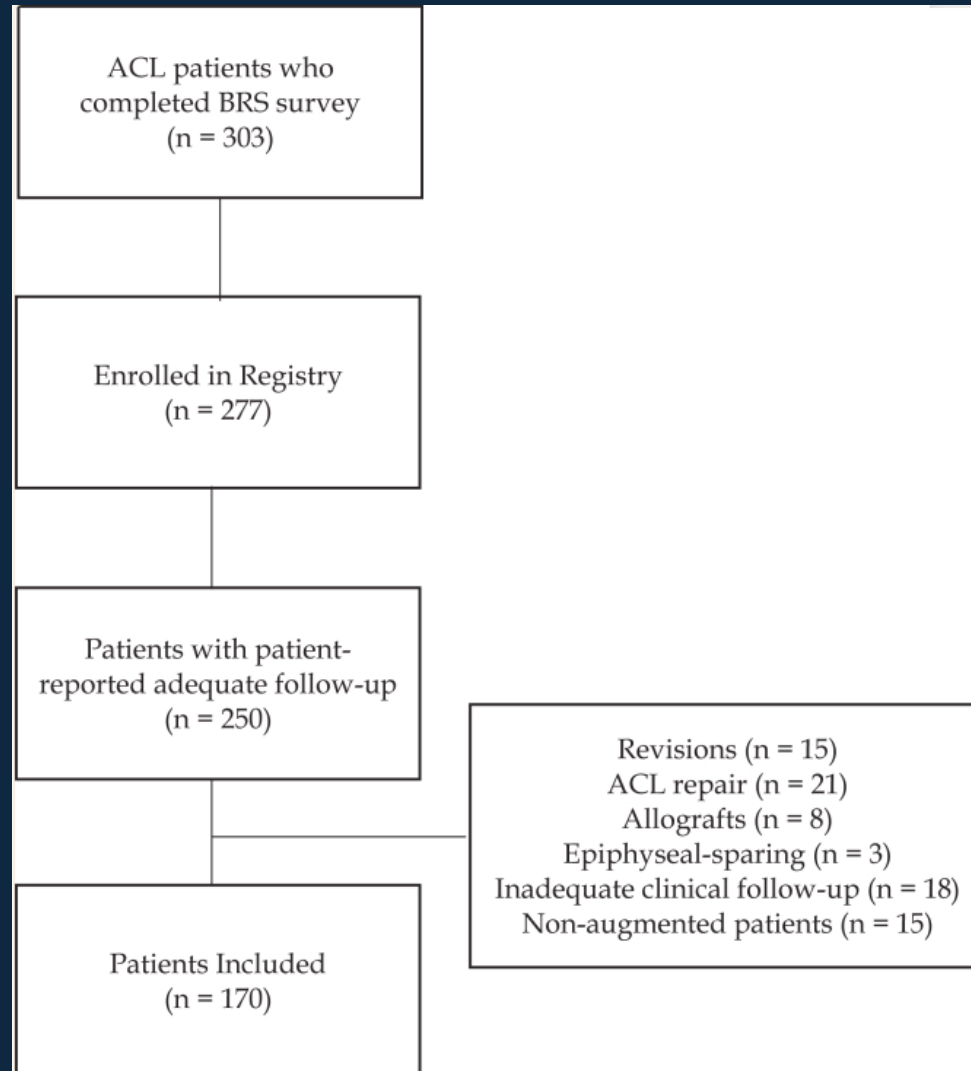
Postoperative Protocol

- All patients sent home with continuous passive motion machine for first two weeks
- Patients typically full weight-bearing postoperative weeks 2-4
- Closed chain exercises when patient achieves full weight-bearing status



Postoperative Protocol

- Patients typically cleared to jog in ACL brace postoperative month 3, agility exercises begin postoperative month 4, and sport-specific exercises begin postoperative month 5
- Patients potentially released to full activity by postoperative month five depending on physical examination, patient readiness, and PT evaluation



Subsequent Interventions

- Patients who demonstrated lower postoperative resiliencies were more likely to be prescribed low-dose oral steroids and additional physical therapy in the short-term postoperative period due to lack of full knee extension
- Do differences seen in other parameters such as use of extension splinting and subsequent surgical interventions

TABLE 3a. Subsequent Surgery.

	(n = 185)	BRS	P
Number of Operations*	27 (14.6)	24.9 (23.7-26.2)	0.92
Revision ACLR	2 (1.1)	24.5 (NA)	0.85
Meniscal	10 (5.4)	24.6 (21.9-27.3)	0.94
Chondral	4 (2.2)	24.5 (NA)	0.88
Hardware Irritation	3 (1.6)	25.0 (NA)	0.99
Contralateral ACLR	8 (4.3)	24.0 (21.6-26.4)	0.42

TABLE 3b. Interventions for Patients with a Postoperative Extension Deficit.

	(n = 54)	BRS	P
Extension Splint	(100)	24.3 (23.2-25.4)	0.61
Physical Therapy	38 (70.4)	23.6 (22.2-25.0)	0.028
Oral Steroids	14 (25.9)	21.9 (19.3-24.5)	0.014
Surgery†	13 (24.1)	24.4 (22.9-25.9)	0.65

Data represented as absolute frequency (percentage) or mean (95% confidence intervals). *One operation may consist of 2 or more procedures. †Consists of either excision of fat pad fibroses, notchplasties, synovectomies, or a combination of these procedures. BRS, Brief Resilience Scale score. ACLR, anterior cruciate ligament reconstruction.



Range of Motion

Lower resiliencies appeared to be very mildly correlated with decreased range of motion

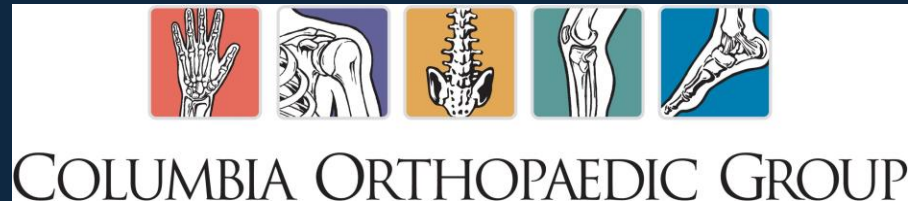


TABLE 4. Associations between Clinical Outcomes and Preoperative BRS Score.

	ROM (n = 185)	Pearson's <i>r</i>	<i>P</i>
Extension			
Preoperative	-0.81° (-1.51°, -0.10°)	0.04 (-0.11-0.18)	0.63
2-week	-0.90° (-1.14°, -0.65°)	0.02 (-0.13-0.16)	0.82
3-month	-0.77° (-1.15°, -0.40°)	0.37 (0.23-0.50)	< 0.0001
6-month	0.11° (-0.17°-0.40°)	-0.04 (-0.18-0.11)	0.61
1-year	0.67° (0.42°-0.93°)	-0.09 (-0.24-0.07)	0.28
Flexion			
Preoperative	118° (115°-121°)	0.07 (-0.07-0.22)	0.32
2-week	86° (84°-88°)	0.26 (0.12-0.39)	0.0004
3-month	131° (130°-133°)	0.07 (-0.08-0.21)	0.34
6-month	138° (137°-139°)	-0.09 (-0.23-0.06)	0.24
1-year	139° (138°-140°)	-0.13 (-0.28-0.02)	0.09
KT-1000, mm			
30-lb pull			
Preoperative	5.57 (5.29-5.85)	0.04 (-0.11-0.18)	0.62
Postoperative	0.74 (0.54-0.94)	0.19 (0.02-0.35)	0.028
Manual maximum			
Preoperative	6.71 (6.36-7.06)	0.05 (-0.10-0.19)	0.54
Postoperative	1.06 (0.82-1.30)	0.15 (-0.02-0.31)	0.080

Data represented as mean (95% confidence intervals) or Pearson's *r* (95% confidence intervals).

ROM, range of motion. Mm, millimeters. lb, pound.



Return to Sport

- Lower resiliency was correlated with a slower return to sport
- However, no significance was found in overall return to sport rate
- *A majority of patients returned to sport eventually*

TABLE 6. Relationship between BRS score and Return to Sport.

	(n = 157)	BRS / Pearson's <i>r</i>	<i>P</i>
Patients returned			0.45
Yes	133 (84.9)	24.3 (23.7-24.9)	
No	24 (15.1)	23.6 (22.2-25.0)	
Return to sport time, m	7.1 (6.7, 7.4)	-0.43 (-0.57, -0.28)	< 0.0001

Data represented as either mean or Pearson's *r* (95% confidence intervals) or absolute frequency (percentage). BRS, Brief Resilience Scale score. M, months.



Conclusion

Patients with lower preoperative BRS scores demonstrated a higher degree of knee extension loss 3 months postoperatively as well as a slower RTS



Significance of Findings

- Preoperative BRS scores may offer some insight on how patients may do in the postoperative period following ACL reconstruction
- Patients with lower resiliencies appear to be mildly limited by correctable ROM deficits which may in-turn affect RTS
- However, more studies utilizing specific subgroups may be necessitated to enhance our understanding on preoperative BRS scores relating to postoperative outcomes following ACL reconstruction