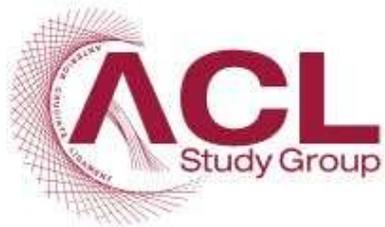


The Association Between Postoperative Pain, Knee Function, And Psychological Factors at 6 Months Following ACLR Using Quadriceps Tendon Autograft



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The Biennial Meeting of ACL Study Group 2026 **COI Disclosure**

Presenting author: Daisuke Araki MD, PhD

Authors disclose following COI in relation to this presentation.

- | | |
|---|--|
| ① Consultation : | Arthrex Inc., Zimmer-Biomet, Depuy-Synthes |
| ② Stock ownership/profit : | NO |
| ③ Patent royalties : | NO |
| ④ Lecture fees : | NO |
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| ⑦ Scholarship/research grants : | NO |
| ⑧ Affiliation with Endowed Department : | NO |
| ⑨ Other remuneration such as gifts : | NO |



Background

Knee Surg Sports Traumatol Arthrosc
(2006) 14: 1021–1028
DOI 10.1007/s00167-006-0050-9

SPORTS MEDICINE

Alberto Gobbi
Ramesc Francisco

Factors affecting return to sports after anterior cruciate ligament reconstruction with patellar tendon and hamstring graft: a prospective clinical investigation

Gobbi A, et al., KSSTA, 2006

Association Between Autograft Choice and Psychological Readiness to Return to Sport After ACL Reconstruction

Joseph C. Brinkman,* MD, Jeffrey D. Hasebrock,* MD, Sailesh V. Tummala,* MD, Evan H. Richman,[†] MD, Jack M. Haglin,* MD, MS, Justin L. Makovicka,* MD, Steven K. Poon,* MD, and Kostas J. Economopoulos,*[‡] MD
Investigation performed at the Department of Orthopedic Surgery, Mayo Clinic, Phoenix, Arizona, USA

Brinkman JC, et al., OJSM, 2025

- ✓ **Barriers to return to sport after ACL-R (BTB / Hamstring tendon (HT))**

Pain: 28 %

- ✓ Graft choice and psychological readiness after ACL-R
- ✓ Quadriceps (QT) autograft was associated with better psychological readiness and faster RTS.

The relationship between postoperative pain, knee function, and psychological factors remains unclear.

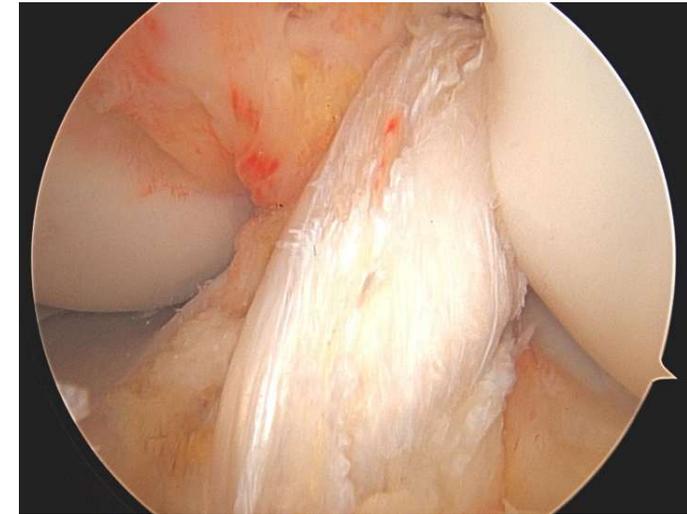


Purpose

To evaluate the relationship between

- ✓ **Post-operative pain**
- ✓ **Knee joint function**
- ✓ **Psychological factors**

at 6 months after ACL-R using a QT autograft.



Materials and methods

Subjects

- ✓ **Primary QT ACLR** at our institution
- ✓ **Pre-op, 3-mo, 6-mo** assessments

59 patients

Sex: 30 males, 29 females
Ave.: 27.0 ± 12.6 y.o,

Assessments

- ✓ Isokinetic knee extensor & flexor strength at 60° /s
(Injured/uninjured ratio)
 - ✓ Heel height difference (HHD)
 - ✓ Heel buttock distance (HBD)
 - ✓ Anterior tibial translation (KT-2000)
 - ✓ IKDC subjective score
- ACL-RSI

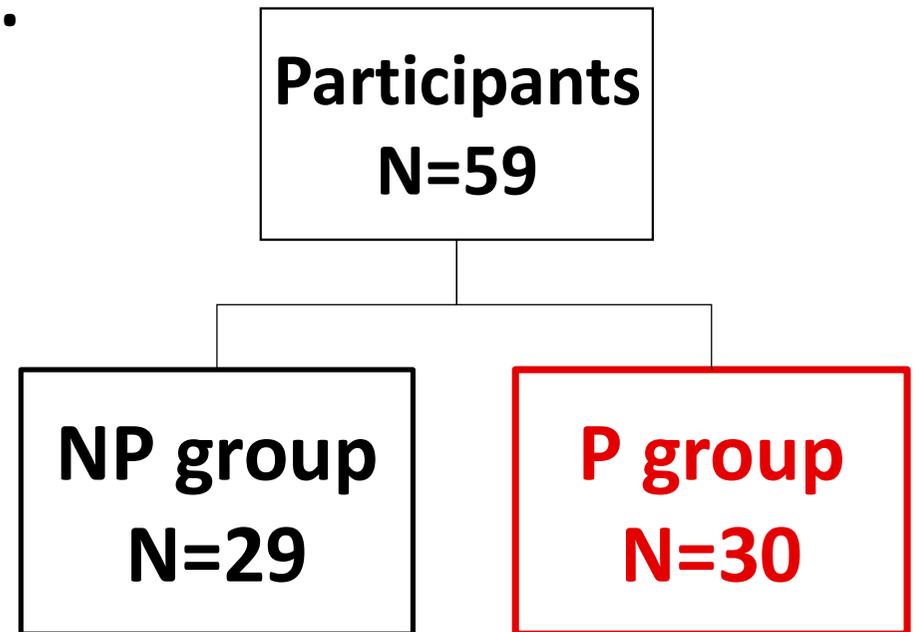


Materials and methods

- **Pain** during knee extension testing: NRS (0–10)
- Grouping at 6 months post-op:
 - NRS 0 = NP (No-pain) group
 - NRS ≥ 1 = P (Pain) group

Statistical Analysis

- Between-group comparisons
- Time points: Pre-op / 3-mo / 6-mo
- Outcome measures: All assessments



Results



Results: Post-op 6 months

	NP group, N = 29	P group, N = 30	p-value
Isokinetic knee extensor (60° /sec.)	64.4 ± 13.3	58.1 ± 19.7	0.16
Isokinetic Knee flexor (60° /sec.)	86.8 ± 16.4	85.5 ± 15.2	0.75
HHD	2.0 ± 2.4	2.0 ± 2.4	0.96
HBD	2.0 ± 3.8	3.9 ± 4.9	0.10
ATT (KT-2000)	1.5 ± 1.8	1.0 ± 2.3	0.37
IKDC subjective score	78.3 ± 11.6	71.2 ± 19.0	0.091
ACL-RSI	64.6 ± 20.5	49.4 ± 19.2	0.005
Pain (NRS) at knee extension	0.0 ± 0.0	2.5 ± 1.5	<0.001

Lower ACL-RSI at 6 months in the P group



Results: Post-op 3 months

	NP group, N = 29	P group, N = 30	p-value
Isokinetic knee extensor (60° /sec.)	44.1 ± 13.7	42.8 ± 18.1	0.76
Isokinetic Knee flexor (60° /sec.)	69.2 ± 15.8	68.6 ± 18.6	0.89
HHD	2.9 ± 2.9	2.9 ± 2.3	0.96
HBD	7.2 ± 6.6	9.2 ± 7.9	0.28
ATT (KT-2000)	0.6 ± 2.1	0.6 ± 2.6	0.98
IKDC subjective score	67.3 ± 9.7	55.6 ± 11.7	<0.001
ACL-RSI	57.7 ± 19.2	42.8 ± 16.9	0.003
Pain (NRS) at knee extension	1.9 ± 1.7	3.4 ± 2.1	0.005

- ✓ Lower IKDC and ACL-RSI at 3-mo in the P group
- ✓ Higher pain scale in the P group



Results: Demographics / Pre-op

	NP group, N = 29	P group, N = 30	p-value
Age	24.5 ± 12.7	29.5 ± 12.2	0.13
Sex: Female	13 (44.8%)	16 (53.3%)	0.51
Body mass index	23.6 ± 3.5	24.1 ± 3.5	0.56
Isokinetic knee extensor (60° /sec.)	65.6 ± 19.3	70.7 ± 24.8	0.38
Isokinetic Knee flexor (60° /sec.)	78.7 ± 25.3	77.5 ± 27.7	0.86
HHD	1.8 ± 2.2	2.2 ± 2.4	0.53
HBD	5.1 ± 6.3	8.4 ± 7.6	0.073
ATT (KT-2000)	4.1 ± 1.7	3.9 ± 1.7	0.59
IKDC subjective score	62.2 ± 13.8	58.2 ± 12.6	0.25
ACL-RSI	66.5 ± 25.0	52.4 ± 19.0	0.019
Pain (NRS) at knee extension	1.1 ± 1.9	1.1 ± 1.7	0.94

Lower pre-op ACL-RSI in the P group



Discussion



Discussion

Key Findings

- **Patients with pain at 6 months after QT ACL-R**
→ had **lower IKDC score** and **higher pain scale** at 3 months.



Physical Therapy in Sport
Volume 41, January 2020, Pages 1-8



After **HT ACL-R**,
knee pain was significantly associated with IKDC score.

Original Research

Worse knee confidence, fear of movement, psychological readiness to return-to-sport and pain are associated with worse function after ACL reconstruction

Hart HF, et al., Phys Ther Sports, 2020

Even after **QT ACL-R**,
early improvement in subjective knee function
may contribute to **pain reduction in the later phase**



Hyogo Rehabilitation Center



Discussion

Key Findings

- **Patients with pain at 6 months after QT ACL-R**
→ had **significantly lower ACL-RSI** at **pre-op**, at **3-mo**, and at **6-mo**.

Current Clinical Concepts: Integration of Psychologically Informed Practice for Management of Patients With Sport-Related Injuries

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The psychological readiness to return to sports of patients with anterior cruciate ligament reconstruction preoperatively and 6 months postoperatively

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Lower ACL-RSI or higher TSK-11 after ACL-R associated with more knee symptoms including pain

Beaz S, et al., J Athl Train, 2023

Patients with low ACL-RSI at 6 months already had low ACL-RSI preoperatively

Ohji S, et al., Phys Ther Sport, 2021

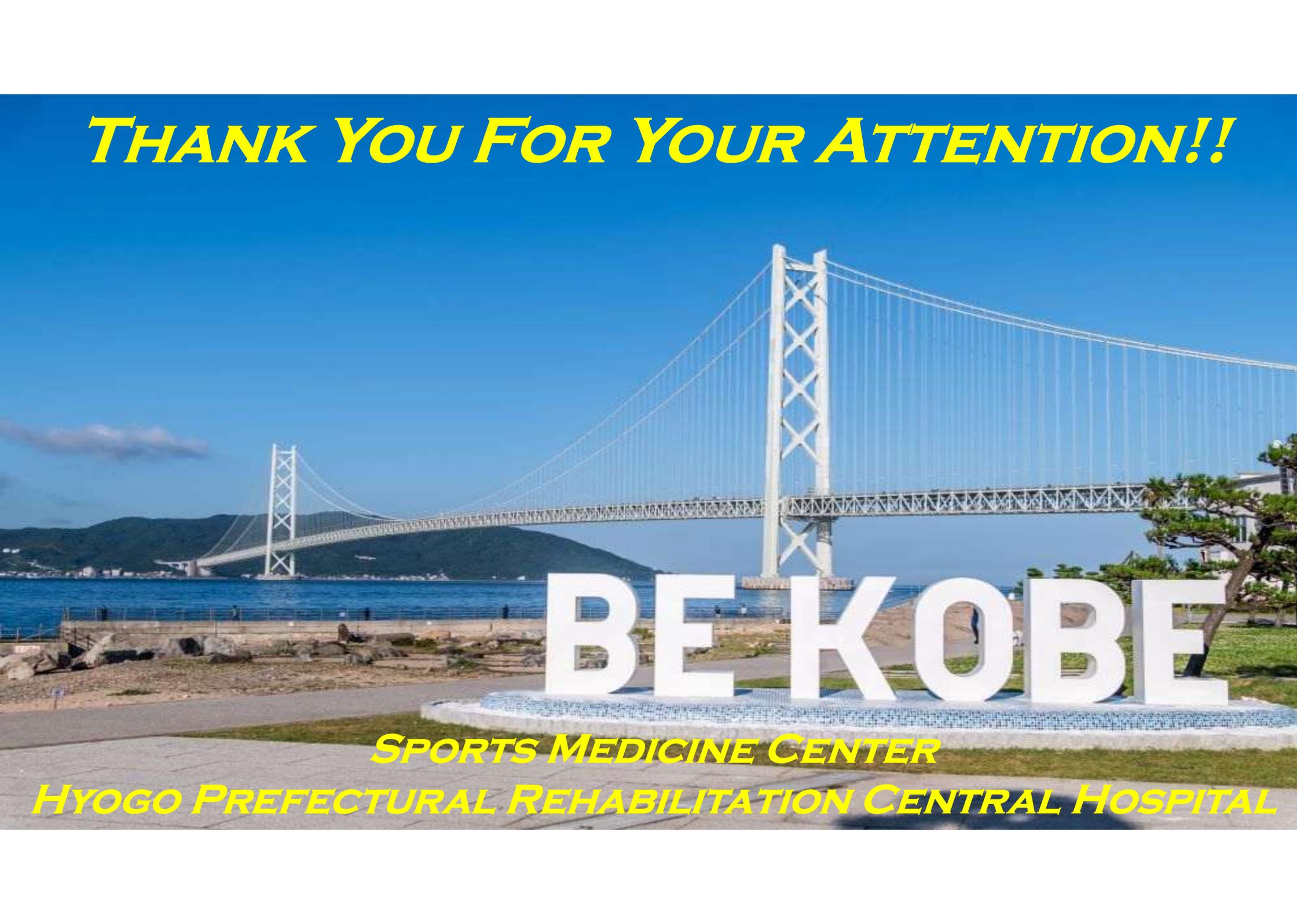
- ✓ Post-op pain may be influenced not only by **post-op factors** but also by **pre-op psychological status**
- ✓ **Adequate pre-op rehabilitation**, including psychological readiness, may be important to **reduce post-op pain**



Conclusion

- Pain at 6 months after QT ACL-R is associated with knee function and psychological factors.
- Early postoperative function and preoperative psychological readiness may affect later pain.
- Preoperative assessment and intervention should be emphasized in rehabilitation.

THANK YOU FOR YOUR ATTENTION!!

A scenic view of the Great Seto Bridge in Kobe, Japan, spanning across the Seto Inland Sea. The bridge's white steel towers and suspension cables are prominent against a clear blue sky. In the foreground, the word "BEKOBEBE" is displayed in large, white, three-dimensional letters on a circular base. The background shows a rocky shoreline, a small beach, and distant hills under a bright blue sky.

BEKOBEBE

SPORTS MEDICINE CENTER

HYOGO PREFECTURAL REHABILITATION CENTRAL HOSPITAL