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Joseph M. Hart, Brian Pietrosimone, Jay Hertel, Christopher D. Ingersoll (2010) Quadriceps Activation Following Knee Injuries: A Systematic Review. *Journal of Athletic Training*: January/February 2010, Vol. 45, No. 1, pp. 87-97.

doi: 10.4085/1062-6050-45.1.87

### Original Research

## Quadriceps Activation Following Knee Injuries: A Systematic Review

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### Abstract

**Context:** Arthrogenic muscle inhibition is an important underlying factor in persistent quadriceps muscle weakness after knee injury or surgery.

**Objective:** To determine the magnitude and prevalence of volitional quadriceps activation deficits after knee injury.

**Data Sources:** Web of Science database.

**Study Selection:** Eligible studies involved human participants and measured quadriceps activation using either twitch interpolation or burst superimposition on patients with knee injuries or surgeries such as anterior cruciate ligament deficiency (ACLd), anterior cruciate ligament reconstruction (ACLr), and anterior knee pain (AKP).

**Data Extraction:** Means, measures of variability, and prevalence of quadriceps activation (QA) failure (<95%) were recorded for experiments involving ACLd (10), ACLr (5), and AKP (3).

**Data Synthesis:** A total of 21 data sets from 18 studies were initially identified. Data from 3 studies (1 paper reporting data for both ACLd and ACLr, 1 on AKP, and the postarthroscopy paper) were excluded from the primary analyses because only graphical data were reported. Of the remaining 17 data sets (from 15 studies), weighted mean QA in 352 ACLd patients was 87.3% on the involved side, 89.1% on the uninvolved side, and 91% in control participants. The QA failure prevalence ranged from 0% to 100%. Weighted mean QA in 99 total ACLr patients was 89.2% on the involved side, 84% on the uninvolved side, and 98.5% for the control group, with prevalence ranging from 0% to 71%. Thirty-eight patients with AKP averaged 78.6% on the involved side and 77.7% on the contralateral side. Bilateral QA failure was commonly reported in patients.

**Conclusions:** Quadriceps activation failure is common in patients with ACLd, ACLr, and AKP and is often observed bilaterally.

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(January/February 2010)

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### Journal Information

**Print ISSN** 1062-6050

**eISSN** 1938-162X

**Frequency** Bimonthly:

January/February  
March/April  
May/June  
July/August  
September/October  
November/December

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