

Quadriceps strength limb symmetry index (LSI) is a common metric used to characterize recovery after anterior cruciate ligament reconstruction (ACLR). However, the independent strength adaptations of the reconstructed and contralateral limbs across rehabilitation and if adaptations are influenced by sex, are often not considered.

Purpose: To examine changes in contralateral and ACLR limb quadriceps strength between early (4-6 months) and late (>6 months) rehabilitation after ACLR, and to explore whether these changes differ by sex.

Methods: Fifty-three participants with primary ACLR (26 females; 18.9±2.6 years) completed bilateral isokinetic knee extension testing at 60°/s during early and late rehabilitation. Peak torque was normalized to body mass (Nm/kg), and LSI was calculated [(involved ÷ uninjured)×100]. Two-way repeated-measures ANOVAs assessed the effects of time (early vs. late) and sex (male vs. female) on bilateral quadriceps strength and LSI. A-priori alpha p<.05.

Results: There were no significant sex by time interactions for ACLR (p=.443) or contralateral limb (p=.700) quadriceps strength, nor LSI (p=.984)(Table 1). ACLR limb quadriceps strength improved significantly from over time (p<.001) and the contralateral limb increased modestly (p=.003). Bilateral change in strength was similar between sexes; however, males produced greater ACLR limb quadriceps torque compared to females across both tests (p=0.002). LSI significantly improved over time for all participants (p<.001) but males demonstrated greater symmetry across both times (p=.002).

Conclusion: While ACLR and contralateral limb strength increase over time, the ACLR limb improves 47.8% more. Adaptations in the contralateral limb do not appear to substantially inflate or diminish ACLR limb strength improvements. LSI likely remains an adequate metric for interpreting ACLR limb strength improvements; however, it may not accurately represent recovery for all individuals.

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Beyond Limb-symmetry Benchmarks: Hop Distances And Quadriceps Strength In Youth And Adult Athletes

Nicholas B. Williams¹, Phillip Gribble², Kathryn Lucas³. ¹Creighton University School of Medicine - Phoenix, Litchfield Park, AZ.

²University of Kentucky, Lexington, KY. ³Creighton University, Litchfield Park, AZ.

(No relevant relationships reported)

INTRODUCTION: Approximately 200,000 individuals aged 10-50 years old (yo) sustain an anterior cruciate ligament (ACL) injury in the United States annually. Following reconstruction (ACLR), younger individuals have increased risk of reinjury compared to older individuals. Return-to-sports (RTS) evaluations often include the limb symmetry index (LSI) for quadriceps strength and hop tests; however, LSI may overestimate recovery if both limbs are weak. Despite the increased reinjury rates among younger athletes, age-specific rehabilitation protocols remain poorly defined. Insights into age-related differences in postoperative outcomes may refine the use of LSI and improve rehabilitation expectations. **PURPOSE:** To compare isometric quadriceps strength and single-leg hop performance between adolescent and adult patients following ACLR. **METHODS:** Athletes aged 12-40 yo completed three maximal single-leg forward hops and five 5-second maximal isometric knee-extensor contractions on both the involved (INV) and uninjured (UNINV) limbs. Primary outcomes included hop distance and peak knee extensor torque for each limb; secondary outcomes included limb-symmetry index (LSI). Participants were stratified into adolescents (13-19 yo) and adults (23-39 yo). One-way ANOVA was used to compare hop distance and peak torque. **RESULTS:** 36 adolescents (13 male) and 13 adults (8 male) completed testing. There were no significant differences between groups in hop distance for either limb (INV: $p = 0.63$; UNINV: $p = 0.45$) or INV limb knee extensor torque ($p = 0.87$). However, adolescents exhibited significantly lower UNINV quadriceps torque (2.74 ± 0.64 Nm/kg) compared to adults (3.18 ± 0.59 Nm/kg; $p = 0.03$). For peak torque, the LSI of the adolescents was 62% while the adults was 55%. **CONCLUSION:** Greater UNINV limb strength observed in adults contributed to lower LSI values compared to adolescents. The higher LSI for adolescents may potentially obscure underlying bilateral strength deficits suggesting that LSI should be interpreted with caution when determining RTS readiness.

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Training Activities Associated With Elbow And Wrist Pain In Competitive Swimmers

Steven Rakos¹, Connie Hsu². ¹University of Colorado Denver, Denver, CO. ²University of Washington, Seattle, WA.

(No relevant relationships reported)

Competitive swimmers are prone to overuse injuries involving nearly every region of the body. While shoulder injuries have been widely studied, distal upper extremity pain, particularly at the elbow and wrist, remains poorly characterized despite its potential impact on training and performance. **PURPOSE:** To evaluate the association between specific training activities on distal upper extremity pain in competitive swimmers.

METHODS: A retrospective epidemiologic survey was administered to 285 swimmers (mean age 18.7 ± 3.1 years), assessing training volume, use of training equipment, dryland activities, and prior injury history. Statistical analyses were performed using SPSS with a conservative population prevalence estimate of 0.50 and significance level of $p < 0.05$.

RESULTS: Of the 285 swimmers surveyed, 14 (4.91%) reported a history of elbow or wrist injury. The most common diagnoses were tendonitis, wrist sprain, and ulnar nerve impingement. One-sample proportion analyses demonstrated significantly greater symptom exacerbation during freestyle ($Z = 2.67$, 95% CI [0.59, 0.97], $p < 0.01$) and paddle use ($Z = 2.14$, 95% CI [0.52, 0.93], $p = 0.02$). Backstroke ($Z = 1.60$, 95% CI [0.46, 0.88], $p = 0.11$) and dryland strength training ($Z = 1.07$, 95% CI [0.39, 0.85], $p = 0.14$) showed a similar trend but did not reach statistical significance.

CONCLUSIONS: Elbow and wrist pain in swimmers is most strongly associated with training modalities that emphasize upper-extremity loading, particularly freestyle swimming and paddle usage. These findings suggest that modifications in dryland and in-water training may help reduce repetitive stress and reinjury risk in swimmers with distal upper extremity symptoms.

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Effectiveness Of Shoulder Ligamentoplasty And Its Relationship With Immobilization Time And Re-dislocation Rate.

Carlos Galindo Rubin¹, Angel Olider Rojas Vistorte², Álvaro Velarde-Sotres². ¹Hospital Universitario Marqués de Valdecilla (HUMV), Santander, Spain. ²Universidad Europea del Atlántico, Santander, Spain.

carlos.galindo@doctorado.uneatlantico.es

(No relevant relationships reported)

PURPOSE: Shoulder ligamentoplasty (SL) is an arthroscopic technique for complex instabilities that uses an artificial ligament to generate a subscapular sling effect that reinforces tissue repair. The main objective of this study was to evaluate the efficacy of SL by analyzing its relationship with postoperative immobilization time and the incidence of re-dislocation. **METHODS:** Seventy-two patients who underwent shoulder ligamentoplasty participated in the study. A retrospective study was

conducted, and the variables of age, sex, and post-surgical immobilization time were analyzed. The Rowe scale, the UCLA scale, and the re-dislocation index were used to evaluate the shoulder. Statistical analysis of the data was performed using version 25 of Statistics Software package[®] (SPSS[®] Inc., Chicago, IL, EE. UU.) with descriptive analysis, chi-square tests, and logistic regression. **RESULTS:** 81.9% obtained a Rowe score ≥ 75 points and 84.7% achieved a UCLA score ≥ 28 points, indicating good or excellent functional results. Only 13.9% presented postoperative re-dislocation, while 86.1% remained stable. 88.9% were men and 59.7% were under 22 years of age. 86.1% were immobilized for ≤ 2 weeks and 13.9% for > 2 weeks. No significant association was found between duration of immobilization and re-dislocation (Chi-square=0.147, $p=0.702$). A strong correlation was found between optimal functional outcomes and absence of re-dislocation. Patients with a Rowe score ≥ 75 did not present with re-dislocation compared to those with a Rowe score < 75 ($\chi^2=52.705$, $p<0.001$). A similar pattern was observed for UCLA ≥ 28 ($\chi^2=26.866$, $p<0.001$). The Rowe and UCLA scales are significant predictors of joint stability ($p < 0.001$), while age and immobilization time showed no predictive effect ($p > 0.05$). **CONCLUSION:** SL demonstrates high efficacy with excellent functional results ($> 80\%$ good/excellent) and a low rate of re-dislocation. Prolonged immobilization does not significantly reduce the risk of re-dislocation. The achievement of optimal functional results is strongly associated with joint stability for both scales. These results suggest prioritizing early rehabilitation protocols over prolonged immobilization, optimizing recovery without compromising stability.

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Dose-response Effect Of Resistance Exercise On Hand Grip Strength In Overweight Or Obese Adults

Jiyeon Yoon, Robert W. Spitz, Duck-chul Lee, FACSM. *University of Pittsburgh, Pittsburgh, PA.* (Sponsor: Duck-chul Lee, FACSM)
jiy239@pitt.edu
(No relevant relationships reported)

Purpose: Muscle strength declines with age and is associated with chronic diseases and mortality. Handgrip strength (HGS) is a feasible indicator for physical function, chronic diseases, and mortality. However, the optimal dose of resistance exercise (RE) to maintain or improve HGS is unclear. To examine the effects of different doses of RE on changes in HGS among adults with overweight or obesity.

Methods: In an ongoing exercise trial, 47 adults (68% female), aged ≥ 40 years old (mean $\pm$ SD: 55.2 ± 8.7) who were overweight or obese were randomized into 1 of 4 groups: 30 minutes aerobic exercise (AE) only ($n=9$), 30 minutes AE plus 15 minutes RE (RE 15; $n=13$), 30 minutes AE plus 30 minutes RE (RE 30; $n=12$), or 30 minutes AE plus 60 minutes RE (RE 60; $n=15$) per session, two sessions per week for 6 months. HGS was tested at baseline and at 6-month follow-up. Participants squeezed the handgrip dynamometer device as firmly as possible for 3 seconds in a seated position with their arms at their sides and with their elbows bent at 90 degrees. The highest value (kg) from three attempts from both hands was used. Linear mixed model was performed to compare changes in HGS across the 4 groups with age, sex, body mass index, and baseline HGS as covariates. Data are check for outliers at both baseline and 6 months and presented as mean change (95% confidence interval; CI).

Results: The average HGS at baseline was 33.0 kg in overall sample. Overall exercise attendance rate was 98.6% over 6 months, which was not different across the 4 groups. There was no statistically significant difference in changes in HGS among the 4 groups ($p=0.31$). Mean changes (95% CIs) in HGS from baseline to 6-month were 2.7 (-1.2, 6.7) kg, 0.4 (-1.2, 2.1) kg, 1.8 (-0.7, 4.2) kg, and 2.5 (0.5, 4.5) kg for the AE, RE 15, RE 30, and RE 60, respectively.

Conclusion: This preliminary study found that there are no significant differences on the changes in HGS across different doses of RE. A larger sample ($n=240$) should confirm the findings after the trial is completed.
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C-45 Thematic Poster – Exercise Oncology Thematic Presentations

Chair: Erik D. Hanson. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

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Characteristics Of Adherence To Exercise In Patients With Advanced Cancer

Mariah Gleeson¹, Clara Hwang², Moriah Persondek², Eleanor Walker², Dennis Kerrigan, FACSM². ¹*The University of Texas Health Science Center, Houston, TX.* ²*Henry Ford Health, Detroit, MI.*
mariah.e.gleeson@uth.tmc.edu
(No relevant relationships reported)

PURPOSE: Describe the characteristics of patients with an advanced cancer diagnosis who participated in an urban supervised exercise oncology program and identify predictors of exercise adherence. **METHODS:** This was a retrospective observational study using data from patients with a stage IV cancer diagnosis who attended the Exercise and Cancer Integrative Therapy Education Program (ExCITE) at Henry Ford Health in Detroit, Michigan. Data sources included patient demographics, medical history, cancer treatments, physical fitness assessments (e.g., six-minute walk distance, sit-to-stand, etc.), exercise sessions attended, and adverse events. Patients selected for inclusion met the eligibility criteria: any patient who participated in the ExCITE program with an advanced cancer diagnosis at Henry Ford Health via physician referrals in the Detroit Metropolitan area. We compared individuals who participated regularly in exercise ($\geq$ eight sessions) to those who attended seven or fewer. More than eight sessions were chosen as the adherence threshold, as it likely reflects at least one session per week, given a median participation of two months. Student's t-test and Fisher's exact test were used to compare groups. **RESULTS:** Between May 2021 and June 2024, 36 patients undergoing active cancer treatment attended the ExCITE program. The most common diagnosis was prostate cancer, followed by lung and breast cancer. Of these, 18 were classified as adherent to exercise. Adherent patients were more likely to be older, Black, and score higher on the initial 30-second sit-to-stand test, and the Functional Assessment of Cancer Therapy-General. Exercise sessions ranged from 1 to 250 over six months. Eight adverse events occurred ($\leq$ grade two), and exercise was resumed within a week. Neither ongoing cancer treatments nor the presence of cardiovascular risk factors influenced adherence to exercise.

CONCLUSION: This study highlights the importance of accessibility to exercise in an urban population, not well described in the literature. Furthermore, screening of functional assessments and comorbidities in this population may better risk stratify those who will do well in a supervised, in-person exercise program.
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Clinical, Functional, And Psychosocial Changes In Adults With Hematologic Malignancies Undergoing CAR T-cell Therapy