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Earlier Time to Aerobic Exercise Is Associated With Faster Recovery Following Acute Sport Concussion

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Objective: To determine whether earlier time to initiation of aerobic exercise following acute concussion is associated with time to full return to sport and school or work.
Design: A retrospective stratified propensity score survival analysis.
Subjects: Acute (≤14 days) physician diagnosed sport-related concussion presenting to an academic sports medicine clinic.
Exposure: Time (days) to initiation of aerobic exercise post-concussion.
Main Outcomes: Time (days) to full return to (1) sport and (2) school or work.
Results: A total of 253 acute concussions [median (IQR) age, 17.0 (5.0) years; 148 (56.4%) males] were included in this study. Multivariate Cox regression models identified that earlier time to aerobic exercise was associated with faster return to sport and school/work adjusting for other covariates, including quintile propensity strata. For each successive day in delay to initiation of aerobic exercise, individuals had a less favourable recovery trajectory. Initiating aerobic exercise at 3 and 7 days following injury was associated with a respective 36.5% (HR, 0.63; 95% CI, 0.53-0.76) and 73.2% (HR, 0.2.7; 95% CI, 0.16-0.45) reduced probability of faster full return to sport; and a respective 45.9% (HR, 0.54; 95% CI, 0.44-0.66) and 83.1% (HR, 0.17; 95% CI, 0.10-0.30) reduced probability of faster full return to school/work. Additionally, the number previous concussions deleteriously influenced recovery to both sport and school; while higher symptom severity negatively impacted recovery to school and LOC reduced the probability of faster recovery to sport.
Conclusion and Relevance: Earlier initiation of aerobic exercise was associated with faster full return to sport and school or work. This study supports the growing body of literature supporting an active rehabilitative approach to the management of concussion and provides greater insight into the benefits and safety of aerobic exercise within the first week of the injury.

The Effectiveness of Platelet-Rich Plasma Injections in Gluteal Tendinopathy—A Randomised, Double-Blind Controlled Trial Comparing a Single Platelet-Rich Plasma Injection With a Single Corticosteroid Injection

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Objective: Gluteus medius/minimus tendinopathy is a common cause of lateral hip pain or greater trochanteric pain syndrome. There would be no difference in the modified Harris Hip score between a single Platelet-Rich-Plasma (PRP) injection compared to a corticosteroid injection (CSI) in the treatment of gluteal tendinopathy.
Study Design: Randomised Double-blind Controlled Single Centre Clinical Trial; Level of evidence 1, recruitment 29 May 2013 to May 2015, follow-up September 2016. Australian New Zealand Clinical Trials Registry: ACTRN12613000677707
Subjects: Two hundred twenty-eight consecutive patients referred with gluteal tendinopathy were screened to enrol 80 participants. One hundred forty-eight excluded (refusal 48, previous surgery 39, sciatica 28, osteoarthritis 17, full thickness tears tendons 17, other 22).
Intervention: Subjects were randomised (1:1) to receive either a blinded glucocorticoid or platelet-rich plasma injection intratendinously under ultrasound guidance.
Outcome Measure: A pain and functional assessment was performed using a Modified Harris Hip Sore (MHHS) questionnaire at 0, 2, 6 and 12 weeks and patient acceptable symptomatic state (PASS) and minimally important clinical difference (MICD) at 12 weeks.
Results: Subjects had a mean age of 60, a ratio of female to male of 9:1 and mean length of symptoms >14 months. Pain and function measured by the mean MHHS showed no difference at 2 weeks CSI 66.95 (SD 15.14) versus PRP 65.23 (SD 11.60) or 6 weeks CSI 69.51 (SD 14.78) versus PRP 68.79 (SD 13.33). The mean MHHS was significantly improved at 12 weeks PRP 74.05 (SD 13.92) compared to the CSI group with a mean score of 67.13 (SD 16.04, $P = 0.048$). The PRP group achieved a PASS score of 74 at 12 weeks, reflecting clinical recovery. The proportion of subjects who achieved the MICD of more than 8 points at 12 weeks was 21/37 (56.7%) in the CSI group and 32/39 (82%) in the PRP group ($P = 0.016$).
Conclusions: Patients with chronic gluteal tendinopathy >4 months, diagnosed with both clinical and radiological examinations, achieved greater clinical improvement at 12 weeks when treated with a single PRP injection than those treated with a single corticosteroid injection.
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Effect of Pseudoephedrine in Sport: A Systematic Review

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Objective: This systematic review investigates the possible ergogenic effects of pseudoephedrine (PSE) and its potential

for performance enhancement. Additionally, the quality of evidence was evaluated for its potential impact on the International Olympic Committee's prohibited and/or monitored substances list.
Data Sources: Two independent reviewers searched EMBASE, MEDLINE, PsychINFO and The Cochrane Library for trials conducted from their beginning to March 2015. All randomized control trials in the English language, including cross-over studies, in relation to PSE use for its ergogenic effect were screened. Studies that met the inclusion and exclusion criteria were reviewed for data extraction and quality assessment.
Main Results: We identified 10 eligible studies involving 116 patients. Overall, the review showed that the ergogenic effect of PSE is dose-dependent in regard to the following parameters: peak anaerobic power, peak power of maximal cycling, time to complete trial, isometric muscle testing, and respiratory function. None of the reviewed studies showed an ergogenic effect at the therapeutic dose of the drug (60-120 mg); however, supratherapeutic doses (≥180 mg) yielded clinically significant results for all measured parameters. The quality of evidence was overall moderate for the effect of PSE on time to complete trials and respiratory function according to Cochrane GRADE guidelines. PSE effects on peak anaerobic power, peak power of maximal cycling and isometric muscle had an overall low grade of evidence.
Conclusions: Owing to the limitations of the published studies in this field, we were unable to make any firm conclusions with respect to the overall effect of pseudoephedrine and its ergogenic effect. It is evident that there is a correlation between the dose administered and its ergogenic effects, but it is also evident that the side effects of using above the therapeutic dose outweigh the possible benefits of using PSE in sport. The banning of substances in competition is highly debated and continually changing; further research with larger sample sizes is required to determine the relationship between doses (≥180 mg) and concentrations in urine that cause an ergogenic effect.

A New In-Skates Balance Error Scoring System for the Sideline Assessment of Concussion in Hockey Players

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Objective: To reduce the delay in returning to the game, we have developed and evaluated a new in-skates balance error scoring system (SBESS) assessment.
Study Design: Prospective, randomized single blinded study.
Subjects: Eighty healthy university hockey player.
Intervention: Subjects were split into 2 groups. An at-rest group performed the SBESS assessment at rest on 2 separate occasions. A post-exercise group performed the test once at rest and once after exercise. The SBESS consisted of performing 4 different stances for 20 seconds each without equipment removal. The assessments were video recorded, and 3 independent reviewers scored the videos.
Outcomes: For both the at-rest and post-exercise groups, the primary outcome measured was the number of balance errors. The secondary outcome was the number of falls.
Statistics: For the primary outcome, both inter-rater and intra-rater reliability were calculated. The concordance between the SBESS and the currently used baseline pre-season balance score (MBESS) was also assessed.
Results: The number of cumulative balance errors for all 4 stances varied between 4 and 7 for both groups without any significant exercise effect. No athletes fell. For inter-rater reliability, the intra-class correlation (ICC) was above 0.86, ranging from 0.86 to 0.92 for most stances except for the easiest stance, for which it was 0.66. For intra-rater reliability, the ICC ranged from 0.88 to 1 for all stances and raters. There was a lack of concordance between the SBESS and MBESS.
Conclusions: The SBESS is a reliable balance test that can be safely performed in healthy athletes wearing their full equipment. The next step will be to evaluate the use of this test on concussed hockey athletes.

Examining the Use of an Intensive Physical Exertion Test as a Final Return to Play Measure in Concussed Athletes

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Objectives: To examine the utility of the of a novel physical exertion test developed by Chicago Blackhawks medical staff, the Gapski-Goodman Test (GGT), as a final return to play (RTP) clearance test in youth and young adult athletes, and to determine the relationship between participant and test variables on RTP within asymptomatic athletes diagnosed with concussion.
Study Design: Prospective cohort.
Subjects: Seven hundred fifty-nine athletes (450 male, 309 female), ages 13 to 25 with a recent concussion who had symptomatically recovered, completed all return to school protocols, had completed preliminary physical exertion testing, all return to play steps, and were attempting to be cleared for a full return to sport.
Intervention: As part of usual patient care, concussed athletes underwent the GGT, at partnered Complete Concussion Management Inc (CCMI) clinics once asymptomatic as part of RTP decision making. The GGT is an intensive physical exertion test designed to mimic the demands of a sporting environment and challenge the cardiovascular, vestibular, visual, and proprioceptive systems with the purpose of identifying lingering concussion-related issues.
Outcome Measures: Main outcome was pass or fail of the GGT based upon self-reported symptom provocation during or closely after completion of the test. Prospective data was collected electronically by trained CCMI clinicians utilizing the Complete Concussion Management database. A de-identified chart review was conducted to examine data collected between January 2016 and February 2017. Participant and test variables were analyzed to determine relationships with pass/fail rate of the GGT.
Results: Although all asymptomatic, 14.6% of concussed athletes failed the GGT while attempting to achieve RTP clearance. Statistically significant relationships were found between failure of the GGT and symptom severity score on initial presentation, and self-reported history of pre-morbid anxiety. When taken together, sex, age, and pre-morbid

anxiety significantly predicted length of time between injury and RTP clearance.
Conclusions: The GGT may identify individuals who are not ready to RTP, despite a self-reported asymptomatic status. These results illustrate that RTP clearance decisions based on self-reported asymptomatic status at rest are inadequate. Instead, monitored, intensive, sport-specific, physical exertion testing should be utilized to inform clinical RTP decisions.

Return to Sport Following Arthroscopic Bankart Repair: A Systematic Review

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Objective: The purpose of this systematic review was to evaluate the rate at which patients return to sport following arthroscopic Bankart repair. Secondarily, functional outcomes in these patients were examined including stability, pain, function, and time to return to sport.
Data Sources: The databases MEDLINE, EMBASE, and PubMed were searched from database inception until July 15th 2017 by 2 reviewers, and titles, abstracts, and full-text articles screened independently. Inclusion criteria were English-language studies investigating arthroscopic Bankart repair on humans of all ages participating in sports of all levels with reported return to sport outcomes. Conference papers, book chapters, review articles and technical reports were excluded. A meta-analysis of proportions was used to combine the rate of return to sports using a random effects model.
Main Results: Overall, 34 studies met the inclusion criteria with a mean follow-up time of 46 months (range, 3-138). Twenty-eight studies were level IV, 4 were level III evidence, one was level II evidence, and one was a randomized clinical trial (level I evidence). The pooled rate of return to any sport participation was 81% (95% Confidence Interval [CI], 74%-87%). Additionally, the pre-injury level of sport was reported in 1441 patients, with a pooled rate of return to the pre-injury level of 66% (95% CI, 57%-74%). Of the 273 patients who participated in competitive sports pre-operatively, the pooled rate of return to their competitive level of sports was 82% (95% CI, 79%-88%).
Conclusions: Arthroscopic Bankart repair yields a high rate of return to sport, in addition to significant improvement in pain and functional outcomes in the majority of patients, including competitive athletes. The highest rates of return to sport were noted in patients undergoing accelerated rehabilitation programs, patients undergoing primary Bankart repair, and those participating in non-overhead sporting activities.

Adapted Physical Activity Program Opportunities in Alberta: An Environmental Scan

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Objective: To identify all physical activity (PA) opportunities available to individuals with physical disabilities in Alberta and describe the characteristics of available programs related to common barriers to PA.
Study Design: Environmental Scan.
Subjects: Any information on adapted programing within the public domain.
Observation Technique: An environmental scan was conducted using internet searches, hand searches of recreation guidebooks, and word-of-mouth. Specific information about programs identified were recorded using a systematic data collection form.
Results: A total of 226 PA programs were identified (104 in Calgary, 73 in Edmonton, 12 in Grand Prairie, 6 in Lethbridge, 10 in Medicine Hat, and 13 in Red Deer) that are or have the potential to be inclusive/adapted for individuals with a disability. Many programs provided limited information about the inclusion and exclusion criteria for participants, support level expected or provided, equipment needs, cost and length of the program. Of the programs that provided age categories the majority of programs were targeted for those 6 to 17 years old.
Conclusions: Lack of transparency regarding program information makes it difficult for families and participants to find/register for adapted PA programming. Programs that provided information about frequency and length of the activity revealed that participating in a single program would not allow youth meet the Health Canada PA guidelines. A better understanding of barriers to adapted PA opportunities and evaluation of adapted PA programs for individual with physical disabilities.
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Hip Capsular Thickness Correlates With Range of Motion Limitations in Femoroacetabular Impingement

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Objective: To explore relationships between capsular thickness, hip range of motion, and demographic factors in patients with FAI.
Study Design: Retrospective case series.
Subjects: One hundred eighty-eight subjects (63 male and 125 female) diagnosed with clinical hip impingement who had undergone hip arthroscopy.

Observation Technique/Outcome Measures: Electronic medical records for all patients with preoperative hip range of motion testing, positive clinical impingement tests, and magnetic resonance imaging (MRI) were included in this study. Data on patient age and sex, hip affected, hip range of motion, and time from symptom onset to surgery were recorded. MRIs were reviewed by a board-certified musculoskeletal radiologist blinded to clinical data. Maximum thickness of the anterior hip capsule was measured in axial, axial oblique, and sagittal oblique sequences. Anterior capsular thickness was also measured at the level of the femoral head-neck junction in axial sequences (axial midline). Correlation between capsular thickness, range of motion, and patient demographics was assessed with Pearson's Correlation Coefficient (r) in Graphpad Prism 6.
Results: Axial midline capsular thickness was negatively correlated with hip flexion ($r = -0.196$, $P = 0.0042$) and internal rotation ($r = -0.143$, $P = 0.0278$). Significant differences were seen between genders in axial midline thickness (5.3 ± 1.4 mm males/4.8 ± 1.3 mm females, $P = 0.0079$), flexion (113 ± 18 degrees males/120 ± 17 degrees females, $P = 0.0029$), and internal rotation (23 ± 13 degrees males/29 ± 12 degrees females, $P = 0.0155$). Significant differences also existed between side affected in flexion (116 ± 17 degrees right/119 ± 17 degrees left, $P = 0.0396$) and internal rotation (26 ± 12 degrees right/29 ± 13 degrees left, $P = 0.0029$). Positive correlation was observed between axial oblique capsular thickness and flexion ($r = 0.2345$) ($P = 0.0229$).
Conclusions: Increased anterior hip capsular thickness at the femoral head-neck correlates with limitations in hip range of motion in FAI. The strength of this relationship may differ between pathologies, genders, and affected side. Pathologic thickening of the hip capsule may contribute to functional limitations in hip disease, and elucidation of this relationship may provide guidance into capsular management during hip arthroscopy.

Prevention of Acute Lower Extremity Injuries in Youth Soccer: A Cluster Randomized Controlled Trial

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Objective: To investigate the effectiveness of neuromuscular training (NMT) in reducing the rate of acute noncontact lower extremity (LE) injuries in youth soccer.
Study Design: Cluster randomized controlled trial with clubs as the unit of randomization.
Subjects: Thousand four hundred twenty-seven players (females n = 280; males n = 1147) aged 9 to 14 years from 20 Finnish soccer clubs (10 in the intervention group and 10 in the control group) were followed for 5 months (2015, January-June).
Intervention: Twenty minutes neuromuscular warm-up program (targeting agility, balance, strength, and proper knee alignment) 2 to 3 times a week during the 5-months study period.
Outcome Measure: The primary outcome was rate of soccer related acute noncontact LE injury.
Results: During the study period, a total of 311 acute noncontact LE injuries occurred: 131 in the intervention group (n = 682) and 180 in the control group (n = 745). A 21% reduction in the rate of acute noncontact LE injury was seen in the intervention group (RR, 0.79, 95% CI, 0.62-1.02).
Conclusions: A NMT program reduced the rate of acute noncontact LE injury in young soccer players. However, statistical significance was not reached.
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Return to Sport After Surgical Management of Proximal Hamstring Ruptures: A Systematic Review and Meta-Analysis

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Objective: The purpose of this systematic review was to evaluate the rate at which patients return to sporting activities after surgical management of proximal hamstring ruptures.
Data Sources: Three databases, PubMed, MEDLINE, and EMBASE, were searched from database inception until October 7, 2017 by 2 reviewers independently and in duplicate. The inclusion criteria were English-language studies that reported return to sport outcomes in patients undergoing surgical management of acute, chronic, complete, and partial proximal hamstring injuries. Book chapters, conference papers, review articles, and technical reports were excluded. The rate of return to sports was combined in a meta-analysis of proportions using a random effects model.
Main Results: Overall, 21 studies with a combined total of 846 patients (849 injuries) met the inclusion criteria, with a mean age of 41.4 years (range, 14-71 years), and a mean follow-up time of 37.8 months (range, 6-76 months). Two of the identified studies were of prospective comparative design (level II), 2 were retrospective comparative (level III), 7 were prospective case series (level IV), and 10 were retrospective case series (level IV). The overall mean time to return to sport was 5.8 months (range, 1-36 months). The pooled rate of return to any sport participation was 87% (95% confidence interval [CI], 77%-95%). The pooled rate of return to pre-injury level of sport was 77% (95% CI, 66%-86%).
Conclusions: Most patients returned to athletic participation. However, there was a notable proportion that were unable to resume activity at a pre-injury level of competition. Subgroup analysis showed similar return to sport outcomes after surgery for partial and complete, as well as acute and chronic proximal hamstring ruptures. High-level comparative studies are needed to make definitive conclusions.

Effects of Kinesiotaping on Symptoms, Functional Limitations and Underlying Deficits of Individuals With Rotator Cuff Tendinopathy: A Single-Blind, Randomized Controlled Trial

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Objective: To determine the effectiveness and benefits, in the mid- and long-term, of therapeutic kinesiotaping, added to a 6-week rehabilitation program in reducing symptoms, functional limitations and underlying deficits related to shoulder control of individuals with rotator cuff tendinopathy (RCTe).

Study design: A single-blind, randomized controlled clinical trial.

Subjects: Fifty-two participants (30 men, 22 women; age: 30.1 ± 8.3 years; height: 1.75 ± 0.11 m; body mass: 73.8 ± 13.9 kg) clinically diagnosed with unilateral RCTe.

Intervention: Participants were randomly assigned to one of 2 treatment groups [Kinesiotaping (KT, experimental); and No kinesiotaping (NoKT, control)]. All participants attended a rehabilitation program composed of 10 physiotherapy sessions over a 6-week period. Kinesiotaping was added to the rehabilitation program of KT group.

Outcome Measures: Symptoms and functional limitations were assessed by Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire, Brief Pain Inventory (BPI) and Western Ontario Rotator Cuff (WORC) index at 4 time-points (baseline, week-3, week-6, and week-12). Underlying deficits included shoulder pain-free and full range of motion (ROM) in frontal and sagittal planes, measured using a universal goniometer, and acromiohumeral distance (AHD) at rest and 60 degrees shoulder abduction measured using an ultrasound scanner. The secondary outcomes were evaluated pre- and post-treatment (baseline and week-6). The evaluator was blinded to the group assignment, whereas participants were blinded to the treatment provided to the other group.

Results: Both groups presented similar improvements at week-3, week-6, and week-12 compared to baseline values. However, there was no significant difference between groups in terms of improvement of symptoms, functional limitations, pain-free ROM, full ROM, and AHD. Multiple analysis of variance (MANOVA) for repeated measures revealed no interactions among the factors included in all outcomes ($P > 0.05$).

Conclusions: Whereas symptoms, functional limitations, ROM, and AHD improved in both KT and control group, there was no difference between groups in the mid- and long-term. Kinesiotaping did not provide additional benefits for individuals with RCTe at mid and long-term. Therefore, the results of our study do not support the addition of kinesiotaping to a 6-week rehabilitation program for improving symptoms, functional limitations and underlying deficits of symptomatic individuals with RCTe.