

qualitative data from all participants confirming DART was simple to use.

**Conclusion** With all significant usability problems addressed DART can proceed to a randomized controlled trial assessing safety and effectiveness against a usual care comparator.

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#### SELECTIVE HEAD-AND-NECK COOLING ACUTELY FOLLOWING SPORTS-RELATED CONCUSSION REDUCES TIME FROM PLAY IN SWEDISH ELITE ICE HOCKEY PLAYERS

<sup>1</sup>Niklas Marklund\*, <sup>1</sup>Ali Al-Husseini, <sup>1</sup>Anna Gard, <sup>2</sup>Erik Andersson, <sup>3</sup>Yelverton Tegner. <sup>1</sup>Lund University, Department of Clinical Sciences, Neurosurgery, Klinikgatan 17A, Sweden; <sup>2</sup>Polar Cool Inc., Medicon Villages, Sweden; <sup>3</sup>Department of Health Sciences, Luleå Tekniska Universitet, Sweden

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**Introduction** Sports-related concussions (SRCs) are an increasingly recognized health problems and treatment options are scarce. We tested the hypothesis that immediate selective head-neck cooling shortens return-to-play (RTP) in concussed ice hockey players.

**Material and Methods** Over 5 seasons, 19 professional ice hockey teams were divided into 2 groups – intervention teams, where concussed players received selective head-neck cooling, and control teams using standard SRC management. Concussion was diagnosed by established criteria. A head-and-neck cooling cap-system, designed to reduce the brain temperature with a cold circulating coolant, was used. The cooling started acutely after SRC diagnosis and was used for  $\geq 45$  min. All players were subjected to a standardized graduated RTP protocol. Before RTP, SCAT baseline level and medical teams' clearance should be reached. The main outcome measure was time until completing the graduated rehabilitation program and RTP.

**Results** In the teams using cooling, 62 concussions were recorded, and 75 in the control teams. Median time to initiate cooling was 11 (range 5–30) minutes. The median time to RTP was 9 days in the cooling group, in controls 12 days ( $p < 0.00001$ ; 95% CI: -7.0; -1.99). In players receiving selective head-neck cooling, 94% (58/62) had an RTP  $\leq 3$  weeks and 100% had an RTP  $\leq 56$  days. In controls, 71% (53/75) had an RTP  $\leq 3$  weeks and 87%  $\leq 56$  days ( $p < 0.001$ ).

**Conclusions** Acute selective head- and neck cooling shortens RTP and reduces the risk of long-term absence from play in concussed ice hockey players.

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#### NUMEROUS TREATMENTS ARE EFFICACIOUS FOR PATELLOFEMORAL PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

<sup>1,2</sup>Bradley Neal\*, <sup>2</sup>Clare Bartholomew, <sup>5</sup>Christian Barton, <sup>2,4</sup>Dylan Morrissey, <sup>2,3</sup>Simon Lack. <sup>1</sup>School of Sport, Rehabilitation and Exercise Sciences, University Of Essex, Wivenhoe Park, UK; <sup>2</sup>Sports and Exercise Medicine, William Harvey Research Institute, Barts and the London School of Medicine and Dentistry, Queen Mary University London, Mile End Hospital, Bancroft Road, UK; <sup>3</sup>Pure Sports Medicine, Point West Building, 116 Cromwell Road, UK; <sup>4</sup>Physiotherapy Department, Barts Health NHS Trust, Mile End Hospital, Bancroft Road, UK; <sup>5</sup>La Trobe Sport and Exercise Medicine Research Centre, School of Allied Health, Human Services and Sport, La Trobe University, Bundoora, 3086, Australia

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**Introduction** Patellofemoral pain (PFP) is common and impacts health-related quality of life. Despite numerous published guidelines, understanding of intervention efficacy is limited.

**Materials and Methods** We registered with PROSPERO (CRD42019152252) and searched multiple databases to April 2021 and included only high-quality randomised controlled trials (RCTs) scoring  $>7$  on the PEDro scale. We pooled methodologically homogenous pain (e.g., numerical rating scale) and function (e.g., kujala scale) data using random effects models at short-, medium- and long-term ( $<3$ ,  $>3$ - $<12$ ,  $>12$  months respectively). Interventions demonstrated primary efficacy if there was a significant comparison with sham, placebo, or wait-and-see control in an adequately powered RCT ( $n > 23$ ) or data pooling. Secondary efficacy or superiority was determined by a significant comparison to an intervention with primary efficacy. The GRADE criteria determined evidence certainty (very low to high).

**Results** We identified 61 high-quality RCTs involving 3,543 participants. Four interventions demonstrated primary efficacy for short-term pain and function: knee-targeted exercise (high/moderate), multi-modal physiotherapy (low/low), foot orthoses (low/absent), and lower-quadrant manual therapy (absent/moderate). Hip- and knee-targeted exercise demonstrated secondary efficacy for pain and function in the short (low/moderate), medium (moderate/moderate), and long-term (moderate/moderate). Knee-targeted exercise combined with perineural dextrose injection demonstrated secondary efficacy in the short-term (moderate/moderate). Multi-modal physiotherapy demonstrated superiority for pain and function in the short-term (very low/very low) compared to knee-targeted exercise alone.

**Conclusions** Wait-and-see, sham, or placebo should not be used for PFP, as several interventions have proven efficacy. Future effectiveness studies should include long-term follow-up. Our synthesis will inform a future updated best practice guide.

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#### SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS AND COHORT STUDIES OF RISK FACTORS FOR KNEE OSTEOARTHRITIS AFTER TRAUMA (OPTIKNEE)

<sup>1</sup>Jackie L Whittaker\*, <sup>1</sup>Justin Losciale, <sup>3</sup>Carsten Juhl, <sup>3</sup>Jonas Thorlund, <sup>3</sup>Matilde Lundberg, <sup>1</sup>Linda Truong, <sup>4</sup>Maxi Miciak, <sup>5</sup>Belle van Meer, <sup>6</sup>Adam Culvenor, <sup>6</sup>Kay Crossley, <sup>3</sup>Ewa Roos, <sup>7</sup>L Stefan Lohmander, <sup>5</sup>Marijenke van Middelkoop. <sup>1</sup>University of British Columbia, Department of Physical Therapy, 2177 Wesbrook Mall, Canada; <sup>2</sup>Arthritis Research Canada, 2238 Yukon Street, Canada; <sup>3</sup>University of Southern Denmark, Denmark; <sup>4</sup>University of Alberta, Faculty of Rehabilitation, Canada; <sup>5</sup>Erasmus MC Medical University Center, Netherlands; <sup>6</sup>La Trobe University, Australia; <sup>7</sup>Lund University, Sweden

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**Introduction** It is unclear why some people develop osteoarthritis after knee trauma and others don't. This study identified risk factors for osteoarthritis following knee trauma.

**Materials and Methods** After protocol registration, 5 databases were searched to 09–2021. RCTs and cohort studies assessing risk factors for symptomatic or structural osteoarthritis in persons with knee trauma, mean injury age  $\leq 30$ -years, and minimum 2-year follow-up were included. Record screening, data extraction and risk-of-bias assessment was duplicated (blinded). Meta-analyses (random effects models) estimated the odds of osteoarthritis for risk factors assessed in  $\geq 4$  studies. Remaining