**Competition**

1. **THE EFFECT OF NEUROMUSCULAR ELECTRICAL STIMULATION ON HUMAN SKELETAL MUSCLE**

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**Introduction**

Neuromuscular electrical stimulation (NMES) can be used to activate skeletal muscles and prevent atrophy during immobilization. However, the underlying acute transcriptomic effects remain to be established. Thus, this study aimed to investigate how a single NMES-session, compared to a voluntary knee extension session (EX), influenced global mRNA expression in the quadriceps muscle using newly developed textile electrodes integrated in pants.

**Materials and Methods**

In 30 healthy participants, gene expression in skeletal muscle biopsies from vastus lateralis was assessed with RNA-sequencing, before and 3 hours after a 30-minute session of NMES and/or EX. The NMES-intensity was set to 20% of each participant’s pre-tested maximal voluntary contraction (MVC), 200±79.7 Nm, corresponding to an acceptable level of discomfort (e.g. mean visual analogue scale 0-10) below 4). The EX-protocol was performed at 80% of 1-repetition maximum.

**Results**

NMES and EX triggered 4448 and 2571 differentially expressed genes (DEGs) respectively, with 80% of EX-response overlapping. Gene set enrichment analysis demonstrated many expressed genes (DEGs) respectively, with 80% of EX-response overlapping. Gene set enrichment analysis demonstrated many common pathways, and well-known exercise-genese, e.g. PARGC1A, ABRA and VEGFA, were also up-regulated by NMES. However, some pathways were exclusive to NMES, e.g. peripheral nervous system development, or EX, e.g. muscle tissue proliferation.

**Conclusion**

A single NMES-session using the NMES-pants, applied with an acceptable level of discomfort at 20% of MVC, induced over 4000 DEGs largely overlapping with DEGs of EX, indicating that NMES to a large extent can produce similar molecular effects as EX. NMES can therefore potentially be an alternative for health benefits, especially in individuals not able to perform exercise.

1. **TENDINOPATHY SEVERITY ASSESSMENT – ACHILLES (TENDINS-A): EVALUATION OF RELIABILITY AND VALIDITY IN ACCORDANCE WITH COSMIN RECOMMENDATIONS**

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**Introduction**

We evaluated construct validity (structural validity and hypothesis-testing) and reliability (test-retest reliability, measurement error and internal consistency) of the new TENDINopathy Severity assessment-Achilles (TENDINS-A), which is the only outcome measure with adequate content validity for assessment of disability in Achilles tendinopathy.

**Materials and Methods**

Participants with Achilles tendinopathy completed an online survey: demographics, TENDINS-A, Foot and Ankle Outcome Score (FAOS) and Victorian Institute of Sport Assessment-Achilles (VISA-A). Exploratory factor analysis (EFA) evaluated dimensionality. Confirmatory Factor Analysis (CFA) evaluated structural validity [Comparative Fit Index (CFI); Standardised Root Measure Square (SRMS)]. Correlations between TENDINS-A and the FAOS/VISA-A evaluated hypothesis-testing. Intraclass correlation co-efficient (ICC) represents test-retest reliability. Cronbach’s α represents internal consistency. Standard error of the measurement (SEM) represents measurement error.

**Results**

Seventy-nine participants (51% female) with a mean (SD) age= 42.6 (13.0) years, height=175.0 (11.7) cm and body mass= 82.0 (19.1) kg were included. EFA identified three meaningful factors, proposed to be pain, symptoms and function. The best model identified using CFA had adequate structural validity (CFI= 0.959, SRMS= 0.068), excluded three items from the original TENDINS-A and included three factors (Pain, Symptoms, and Function). The TENDINS-A exhibited moderate positive correlation with FAOS (rho=0.598, p<0.001), and moderate, negative correlation with VISA-A (r=-0.639, p<0.001). Reliability of the TENDINS-A is excellent (ICC=0.930; Cronbach’s α=0.808; SEM=6.54 units).

**Conclusions**

Our evaluation of the revised 10-item TENDINS-A has determined it has adequate validity and reliability. Thus, the TENDINS-A can be recommended for immediate use, being the preferred tool over all others to assess disability in Achilles tendinopathy.

2. **REFERENCE DATA ON QUALITY OF LIFE AND FUNCTION IN PATIENTS WITH PATELLAR DISLOCATION AND TROCHELAR DYSPLASIA: A NATIONAL COHORT STUDY**

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**Introduction**

To investigate patient reported outcome measurement (PROM) reference data on a national cohort of patients between 15-19 years with prior patella dislocation and trochlear dysplasia.

**Material and Methods**

All inhabitants in the Faroe Islands between 15 to 19 years were invited to answer an online survey. The survey included questions concerning prior patellar dislocation and the PROMs: Banff Patella Instability Instrument (BPII), Kujala score, Marx score and the EQ-SD-5L. Three cohorts were established: 1) The background cohort consisting of the participants with no prior patellar dislocation, 2) The patellar dislocation cohort consisting of all participants with prior patellar dislocation, 3) The trochlear...
dysplasia cohort consisting of participants with prior patellar dislocation who had trochlear dysplasia.

**Results** 3749 persons were contacted and 1119 (30%) completed the demographic survey and at least one PROM. 43 persons had prior surgery to the knee and were excluded. 102 reported prior patellar dislocation, of whom 57 were found to have trochlear dysplasia. All PROMs except the Marx score reflected worse quality of life and function after patellar dislocation compared with the background population, most pronounced in the BPII. The percentage of people experiencing problems in the EQ-5D-5L dimensions were increased for the patellar dislocation cohort and the trochlear dysplasia cohort in all EQ-5D-5L domains, except for anxiety/depression.

**Conclusion** Young people (age 15-19) with prior patellar dislocation report seriously affected quality of life and function measured with the BPII, the Kujala, the EQ-5D-5L index values, and all EQ-5D-5L domains except anxiety/depression.

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# Ensuring Content Validity of a New Patient Reported Outcome for Children with ACL Deficiency: Development of the ‘Kids-Knees-ACL’

Christian Fugl Hansen*, John Brandt Brodersen, Michael Rindom Krogsgaard.

**Materials and Methods** The development adhered to ‘COS-MIN’ guidelines for PROM development. Informants were children with ACL deficiency, purposively sampled based on age, sex, and treatment method. Semi-structured interviews were guided by an interview guide within the ICF model and continued beyond data saturation. New themes and items emerged by thematic analysis and probing items from the adult Knees-AACL. Content coverage, relevance, and understandability were continuously evaluated. All interviews were recorded and transcribed verbatim. The NVivo 12 software was used for data analysis and coding of items. All content was tested in its final form.

**Results** There were substantial differences in the psycho-social impact between adults and children. The children experienced a more considerable negative psycho-social impact caused by a loss of participation in sports, lower self-confidence, and a loss of social networks. This resulted in four domains; “School”, “Friends”, “Family” and “Mood and self-confidence”. The physical aspects were quite similar, with few exceptions. 41 of 55 items from Knees-AACL were endorsed; however, all required rewording to ensure understandability.

**Conclusion** A preliminary version of ‘Kids-Knees-AACL’ containing 60 items across nine domains was developed. Modifications based on subsequent psychometric analysis will ensure adequate measurement properties of a final version.

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# The Happy Concept Mapping Study: “To Prevent Injuries in Young Handball Players It’s Important To…” – Perceptions Among Various Stakeholders

Lise Luthebertt, Alex Donaldson, Lotte N Andersen, Ewa M Roos, Merete Møller.

**Introduction** This study aimed to identify facilitators for implementing injury prevention initiatives in youth handball, and to assess stakeholders’ perceptions of their importance and feasibility.

**Materials and Methods** Four stakeholder groups — coaches, administrators, health staff and players — participated in this mixed-method concept mapping study. Participants (n=224; 19% coaches, 22% health staff, 63% players, 18% administrators) first provided statements about facilitators for implementing injury prevention initiatives in youth handball, then grouped them (n=47), before rating them (n=57) for importance and feasibility (5-point Likert scales). Stakeholder-specific cluster maps and Go-Zone scatter plots were created. Statements rated above average for both importance and feasibility were considered as prioritized (Go-Zone 1).

**Results** 87 unique statements were generated during brainstorming. Multidimensional scaling and hierarchical cluster analysis resulted in similar sorting data clustering patterns for coaches, health staff, and administrators, incorporating federation strategies, club strategies, and coach and athlete education/knowledge. All clusters were rated >3 on average ratings of importance by all stakeholder groups. Six statements were in Go-Zone 1 for all stakeholder groups, including three statements about coach knowledge and education. Players’ statement importance and feasibility ratings had limited overlap with other stakeholder groups’ Go-Zone 1 statements. Players’ Go-Zone 1 statements mainly addressed individual load management and practical training setup.

**Conclusion** Coach knowledge and education, alongside collaboration among stakeholder groups, are essential when implementing injury prevention initiatives in youth handball. Stakeholder groups have varying perspectives, underscoring the importance of understanding and addressing these diverse viewpoints when implementing initiatives.

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# Child’s Physical Function One Year and Three Years After an Anterior Cruciate Ligament Reconstruction

Mathilde Lundgaard-Nielsen*, Robert Bennike Herzog, Susan Warming, Martin Wyman Rathcke, Stig Peter Magnusson, Michael Rindom Krogsgaard.

**Introduction** Evaluating treatment outcomes for children with anterior cruciate ligament (ACL) deficiency relies on patient-reported outcome measures (PROMs). The existing knee-specific pediatric PROMs lack content and construct validity for children with ACL injury. This study aimed to develop a preliminary version of a new PROM for children with ACL injury.

**Materials and Methods** The development adhered to ‘COS-MIN’ guidelines for PROM development. Informants were children with ACL deficiency, purposively sampled based on age, sex, and treatment method. Semi-structured interviews were guided by an interview guide within the ICF model and continued beyond data saturation. New themes and items emerged by thematic analysis and probing items from the adult Knees-AACL. Content coverage, relevance, and understandability were continuously evaluated. All interviews were recorded and transcribed verbatim. The NVivo 12 software was used for data analysis and coding of items. All content was tested in its final form.

**Results** There were substantial differences in the psycho-social impact between adults and children. The children experienced a more considerable negative psycho-social impact caused by a loss of participation in sports, lower self-confidence, and a loss of social networks. This resulted in four domains; “School”, “Friends”, “Family” and “Mood and self-confidence”. The physical aspects were quite similar, with few exceptions. 41 of 55 items from Knees-AACL were endorsed; however, all required rewording to ensure understandability.

**Conclusion** A preliminary version of ‘Kids-Knees-AACL’ containing 60 items across nine domains was developed. Modifications based on subsequent psychometric analysis will ensure adequate measurement properties of a final version.

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# ACL and Adolescent Knee Pain

Mathilde Lundgaard-Nielsen*, Robert Bennike Herzog, Susan Warming, Martin Wyman Rathcke, Stig Peter Magnusson, Michael Rindom Krogsgaard.