

NR. 1
Artikelsamling
2020



DANSK
IDRÆTSMEDICINSK
SELSKAB

DANSK
SPORTSMEDICIN

OPSAMLING AF ARTIKLER 2020, NR 1



Indhold

Denne opsamling af artikler, indeholder følgende artikler:

Talentfulde Fodboldspillere eller Talentfulde Relationer? Et casestudie om overgangen fra ungdoms- til seniorhold i elitefodbold.....	2
Dealing with loss of identity in youth sports – management of the of a career-ending sport injury	5
High Prevalence of Musculoskeletal Pain Among Esports Athletes	8
Cognitive load and fatigue in low load physical activities such as computer work or e-sport	11
Fra rehabiliteringsforløb til idrætsforening – giver det overhovedet mening?.....	15

Talentfulde Fodboldspillere eller Talentfulde Relationer? Et casestudie om overgangen fra ungdoms- til seniorhold i elitefodbold

- Udgivet 10. november 2020

Forfattere: Jakob Bo Nielsen (1), Cand.Scient i Idræt og Samfunds fag, jakobbonielsen@outlook.com
Aalborg Universitet; Niels Nygaard Rossing, Adjunkt i spiller og talentudvikling. nnr@hst.aau.dk, Aalborg Universitet

(1) Adgang til originalstudiet kan ske gennem førsteforfatter

Indledning

Den elitære sportslige karriere bliver populært opdelt i forskellige stadier såsom *sampling-, developmental-, mastery-, maintenance- og discontinuation-stadie*(1). Den succesfulde karriereudvikling forudsætter, at atleten gennemgår disse stadier og overgangene imellem. Overgange mellem stadier bliver ofte beskrevet af atleter, forskere og praktikere som en nøgleudfordring for atleter i deres sportslige karriere(1). Litteraturen identificerer overgangen fra ungdoms- til seniorsport som den afgjort mest udfordrende i den elitære sportslige karriere(1,2). Netop denne overgang har derfor et stort fokus hos både praktikere og forskere. Overgangen er udfordrende på mange parametre, og stagnation, uregelmæssige præstationer og frafald er nærmere reglen fremfor undtagelsen hos unge atleter(1). Overgangen har primært været undersøgt i et klassisk psykologisk syn, hvor atleterne og deres psykologiske håndteringsevner har været i fokus. I den senere tid har et socialt og relationelt syn på evne, talent og udvikling(3) vundet større tilslutning. I dette syn er relationer mellem mennesker en afgørende komponent i henhold til udvikling af færdigheder og det at fremstå talentfuld i en given kontekst(3). De få studier der har undersøgt relationers betydning i overgange, har fokuseret på trænerrelationen og forældrerelationen(2,4). Indenfor holdsport kan relationerne mellem spillere siges at være særlig vigtige for udvikling og trivsel(3,5). Disse relationer er ikke yderligere undersøgt i en udviklingsmæssig udfordrende situation som overgangen fra ungdoms- til seniorholdsport, hvilket vil være omdrejningspunktet for denne artikel.

Metode og teori

Undersøgelsen beskrives som et intrinsic casestudie(6), idet casen i sig selv er omdrejningspunkt for vores interesse. Vi har derfor været mere optaget af at forstå selve casen og dens kompleksitet, fremfor casens potentiale til at repræsentere andre cases. Dette betyder dog

ikke, at erfaringer gjort sig i casen, ikke kan være relevant for andre cases bundet af samme sociokulturne kontekst(3). Casen defineres som overgangen til et specifikt seniorhold indenfor elitefodbold. Undersøgelsen tog teoretisk udgangspunkt i et holistisk udviklingsperspektiv på overgange(4), der fokuserer på atleten i alle sfærer af livet. Undersøgelsen drog inspiration fra Barab & Plucker(3) og deres teoretiske forståelse af, at udvikling er en social og relationel proces, hvorfor vi er særligt optaget af relationen mellem mennesker. Individuelle semi-strukturerede interviews blev udført med fem spillere, der gennemgik overgangen samtidig, og en mentaltræner (n=6) for at undersøge genstandsfeltet fra flere perspektiver. Interviewene blev transkribert og anonymiseret. Tematisk analyse(7) blev anvendt til at analysere interviewene, hvilket genererede fire temaer (relationernes betingelser, fællesskabets betydning i overgangen, de etablerede spilleres rolle og flere i samme båd), samt dertilhørende undertemaer. Idet forskning på talentudvikling generelt(3), og i særdeleshed fodbold, er særlig optaget af individuelle færdigheder og præstationer(8), har vi valgt at kaste et særligt blik på fællesskabets betydning i overgangen og de etablerede spilleres rolle.

Analyse

Relationerne var betinget af et eksisterende hierarki på holdet, hvorom respekt og spilletid var afgørende for at bevæge sig i dette hierarki. Dette besværliggjorde overgangen betydeligt for de unge spillere. Fællesskabet, og de gode sociale relationer udenfor og på banen, var derfor afgørende i overgangen. Spillerne gav udtryk for, at det er afgørende for at kunne præstere og falde til, at man trives, hvor man er. Fællesskabet bidrog til, at der ikke var en konkret opdeling på holdet, og at alle snakkede med hinanden. Dette skabte gode sociale relationer, og spillerne beskrev, at de derfor kunne fokusere på præstationerne på banen, at bidrage i træningen og var mindre bange for at lave fejl.

"Det der med at man ikke er nervøs inden træning og kamp og sådan noget, fordi man har det godt med de spillere man spiller med, og de folk der er omkring truppen. Det tror jeg har været rigtig vigtigt, fordi så har man kunne have is i maven, og kunne spille derinde." – Spiller 4

Gode relationer mellem spillere, og et socialt inkluderende fællesskab, var derfor vigtigt på flere parametre, og lettede overgangen for de nye spillere. Relationen mellem ny- og etableret spiller blev beskrevet som særlig vigtig i overgangen. Det blev beskrevet som afgørende for overgangen, at de etablerede spillere "vil se de nye spillere lykkes".

"For en ung spiller der skal lykkes, som kommer op i en seniortrup, er det vigtigt at de eksisterende spillere gerne vil at man lykkes. Hvis de ikke vil det, så kan man heller ikke præstere." – Spiller 2

De etablerede spillere satte dermed rammerne for, hvorvidt de nye spillere kunne etableres og lykkes på holdet. Relationen mellem etablerede og nye spillere var særlig betinget af, at der var gensidig anerkendelse, og at begge parter opsøgte hinanden. I forbindelse med dette blev relationen beskrevet som afgørende, i henhold til den læring der er til rådighed for de nye spillere. Dette både i forhold til holdets kultur, og hvad

det vil sige at være en del af holdet, samt det at være seniorspiller, men ligeledes den fodboldmæssige udvikling. Denne læring blev beskrevet både som verbal (kommunikation) og non-verbal (observation og rollemodeller). Særligt relationen mellem nye- og etablerede spillere på samme position på banen, blev beskrevet som en påvirkelig relation med stort potentiale. De nye spillere kunne her indgå i en mestringsorienteret relation, hvor de etablerede spillere kunne agere læringsmestre i forhold til positionsspecifikke såvel som overordnede elementer i fodboldspillet.

Anbefalinger

Relationer er en unik ressource til læring og trivsel, og arbejdet med overgangen kan med fordel fokusere på at styrke relationerne mellem nye og etablerede spillere. Klubber kan fokusere på at etablere mentorskab i disse relationer(9). På denne måde kan nye spillere ikke alene lære holdets kultur og værdier, men ligeledes gavne af fodboldmæssig udvikling. Ydermere kan klubber fokusere på at styrke relationskompetencer og sociale færdigheder hos unge talenter før overgangen. Det at være talentfuld indenfor holdsport er mere end blot fysiske og psykologiske færdigheder, det handler også om at kunne engagere sig i betydningsfulde relationer(3,5,9).

Referencer

1. Stambulova et al. (2009): "ISSP Position Stand: Career development and transitions of athletes." *International Journal of Sport and Exercise Psychology*, 7, s. 395-412. doi: 10.1080/1612197X.2009.9671916
2. Morris et al. (2019): "A meta-study of qualitative research on the junior-to-senior transition in sport." *Psychology of Sport and Exercise*, 45 (2019), 101556. doi: 10.1016/j.psychsport.2019.101556
3. Barab, S. & Plucker, J. (2002): "Smart People or Smart Contexts? Cognition, Ability and Talent Development in an Age of Situated Approaches to Knowing and Learning." *Educational Psychologist*, 37(3), s. 165-182. doi: 10.1207/S15326985EP3703_3
4. Wyllemann, P. & Lavallee, D. (2004): "A developmental perspective on transitions faced by athletes." In: *Developmental sport and exercise psychology: a lifespan perspective*. (Ed.) M. Weiss, s. 507-527.
5. Eys et al. (2019): "The Dynamic Group Environment in Sport and Exercise." *Psychology of Sport & Exercise* 42 (2019), s. 40-47. doi: 10.1016/j.psychsport.2018.11.001
6. Stake, R. (2005): "Qualitative case studies." In: *The hand book of qualitative research*. (Ed.) N. K. Denzin & Y. S. Lincoln, 3, s. 443-466, London: Sage.
7. Sage.Braun, V. & Clarke, V. (2006): "Using thematic analysis in psychology." *Qualitative Research in Psychology*, 3 (2), s. 77-101. doi: 10.1191/1478088706qp063oa
8. Rosenkilde et al. (2018): "At være på det rigtige sted på det rigtige tidspunkt: Ressourcer og barrierer i overgangen fra ungdoms til førstehold i en dansk elitefodboldklub". Publiceret på idrottsforum.org d. 2018-11-09, tilgængelig på: <https://idrottsforum.org/wp-content/uploads/2018/11/rosenkildeetal181109.pdf>
9. Benson et al. (2016): "Organizational socialization in team sport environments." *Scandinavian Journal of Medicine & Science in Sports*, 26, s. 463-473. doi: 10.1111/sms.12460

Dealing with loss of identity in youth sports – management of the of a career-ending sport injury

- Udgivet 29. juli 2020

Authors

Lyng KD¹, Dalsgaard SH², Johansen SK¹, Rathleff MS^{1,3,4}, Rossing NN²,

1. Center for General Practice at Aalborg University, 2. Sport Sciences, Department of Health Science and Technology, Aalborg University, 3. Department of Health Science and Technology, 4. Faculty of Medicine, Aalborg UniversityDepartment of Physiotherapy and Occupational Therapy, Aalborg University Hospital.

Contact

Kristian Damgaard Lyng

Affiliation address: Fyrkildevej 7, 9220 Aalborg Øst

Telephone: +45 30669439

E-mail: klyng@dcm.aau.dk

Introtext

Career-ending sport injury (CESI) forcing an unexpected transition out of sport, can have severe consequences for adolescents' lives.

Adolescence is a crucial phase where the present and future identity is shaped by the environment and experiences. In this paper, we will introduce the reader to a former football player who had a career-ending hip injury at an early age and how the unwanted transition developed into anxiety, depression, and a feeling of loss of identity. Based on sports psychology research, we will present some practical considerations to manage the psychosocial difficulties associated with early retirement caused by CESI.

Introduction

Physical activity and sports participation have been linked to increased wellbeing and health (1,2), better academic achievements (3) and occupational status in later life (4). However, physical activity and competitive sports also increase the risk of injuries and pain, which can lead to a premature end of a sports career for athletes. The transition out of a sports career is a significant process for an athlete, and involuntary events like sports injuries negatively impact this process (5). CESI does not only affect physical health, but it also has negative psychosocial impacts, which can lead to loss of identity, loneliness, depression, and anxiety (5).

Therefore, athletes who experience CESI often need social and emotional support in addition to the clinical support for their injury (5). As healthcare practitioners, we often manage injuries in confidential one-to-one sessions using a holistic health perspective (6). In this short paper we aim to bridge the gap between sports psychology and rehabilitation. This will be done

in order to provide practical psychosocial guidance for practitioners who works with adolescents who are, or have been, forced to stop playing their sport because of a CESI.

What is an “identity”?

Several attempts have been made in order to define the concept of identity. In this paper our understanding of identity was inspired by Bruner and colleagues' work on how youth sports constitutes arenas for social-identity development (7) and defined as; *That part of an individual's self-concept which derives from his/her knowledge of his/her membership of a social group (or groups) together with the value and emotional significance attached to that membership*. It is essential to point out that dealing with CESI in adolescents is a team effort and might require support from multiple professions including physiotherapists, medical doctors, psychologists and other stakeholders such as family and friends. In such cross-disciplinary teams, it is important that each profession is aware of their capabilities, limitations and understand the capabilities of the other team members. Such knowledge can aid choosing the right help, at the right time.

Importantly, we have to very sensitively address every transition from participating player to injured player because it can be a very stressful, likely, unprepared process that is complex and multidimensional (8). The multi-dimensionality and complexity of CESI is not adequately explained by current psychosocial literature for rehabilitation after sports injury (9).

Nevertheless, the existing literature highlights three primary resources, coping skills, social support, and pre-retirement planning that each influence the athlete's thoughts, emotions, and

behaviours. Throughout this paper, we will elaborate on these resources in the context of a semi-structured interview with Maria (pseudonym) and the experiences and challenges she faced during her time after she ended her active sports career (Box 1).

Box 1: Case

Maria, 19 years old. She used to play football at an elite level in Denmark until she turned 18. After suffering a hip-injury, she had several unsuccessful experiences with physiotherapy and medications. After a 3-month period away from football, with no improvement in pain, she decided to end her football-career. Immediately after her CESI she felt a gap in her life and started to develop stress, anxiety and depression which eventually led to her high school drop-out. During this process, Maria felt that she was alone with the processing of the emotional impact in relation to her CESI and the development of a new self-identity. Maria states she has learned a lot about herself and how to cope with stressful situations, although in retrospect, she believes that better management of her emotions from her surroundings would have eased the transition away from the sport and helped her reshape her identity.

Providing social support in consultations

After the CESI from football, Maria felt a sense of restlessness and a loss of identity where she found herself in a void. From the interview, Maria highlighted the positive effects that seeing a psychologist had on her mental health. Seeking and gaining psychosocial support is an essential coping strategy for a successful career transition, especially during CESI (5). Sharing emotions and entrusting somebody is an essential coping mechanism for stress relief, and it can help young athletes to reconcile with their transition (10). Providing this kind of social support are not restricted to be performed in a consultation room but it could be performed in any setting where it is possible to create an intimate environment. Type of environment is secondary, but it is important that we create a trusting therapeutic alliance in order to ask into psychosocial aspects of the adolescents' situation. Furthermore, the physiotherapist must consider that patients' challenges may be multifaceted, with patients

struggling with learning to manage their injury, in concert with finding a foothold in a reality outside their familiar social arenas. Using work as a metaphor, Corbin & Strauss (11) describes the overlap between identity and self-management. By highlighting self-management as three lines of work: Illness-, everyday- life and autobiographical work, the patient's efforts towards sense-making and coming to terms with the conditions is isolated as an autonomous process. Thus, understanding and helping patients to overcome illness- and life challenges can free up energy and allow them to commence working towards reconstructing their lives (11). To facilitate this process, the field of psychotherapy highlights the importance of interpersonal skills such as empathy and warmth which can contribute to positive outcomes (12). In the case of Maria, it is therefore, important that we dare to ask and listen with compassion *how she feels* and facilitate a non-judgemental space for them to express themselves. Hence, by supporting the athletes in expressing their thoughts, emotions and stress, we can contribute to the processing of grief so athletes may accept the situation, which can be a hampering barrier of the transition out of the sport and move on in their life.

Moving on

CESI acts as a way of moving on to the next stage in an athlete's life. However, when it is unpredicted, unplanned or unwanted, this can be overwhelming and lead to a feeling of losing control over their lives (8). In Maria's case, the void after her CESI and the lack of support associated with this, was overwhelming and made it difficult for Maria to move on. Especially, in these cases, we have to be careful and sensitive to the situation by not neglecting the athlete's feelings and let this process proceed on their behalf. We understand identity as socially constructed and we must be aware of the person's identity as dynamic and subject to ongoing negation via interactions with others e.g. friends, peers, parents, clinicians and engaging in shared activities (13). Therefore, it is essential that the social support can alleviate planning for the future, which is essential for adjusting to the life after a CESI and develop a new identity inside (e.g. as a supporting coach) or outside of the sport by meaningful interacting with known groups in new ways or gaining new social groups (8).

This allows us to be curious about the athlete's other interests in life and seek out new life opportunities, sports or non-sports related. In

essence, this process might happen later in the process with great caution because career-ending injuries often happen unexpectedly, which makes their plan of life and future hopes and dreams fall to pieces. If so, we acknowledge and empathize with their situation. In doing so, we can try to support by resonating their strength and values and how it can favour them in the future.

Summary

Supporting an adolescent after a career ending sport injury is a complex task. It involves a delicate balance between focusing on the injury versus supporting the adolescent to transition into a new “world” where they are no longer primarily defined by being an athlete. The take-home message is that social support is an essential part of processing and transitioning

after a CESI. The degree of social support can vary over time but is built on the foundation of a trusting therapeutic alliance. This includes compassion and supporting the adolescent to reconcile with their situation. When the athlete is ready to move on, they should be offered support and encouraged to plan the next stage of their life. Planning for the future is essential for moving on in life and may aid developing a new meaningful identity and social circles. This process is crucial to ensure their well-being and to adjust to their new identity and life. The adjustment is a complex process and the course of transition is highly individual. However, the team surrounding the adolescent athlete have an important task making sure that all focus is not only on the physical injury, but also on the psychosocial aspects of transitioning from sport.

References

1. Bell SL, Audrey S, Gunnell D, Cooper A, Campbell R. The relationship between physical activity, mental wellbeing and symptoms of mental health disorder in adolescents: a cohort study. *Int J Behav Nutr Phys Act.* 2019;16(1):138.
2. Faienza, M.F., Wang, D.Q.H., Frühbeck, G. et al. The dangerous link between childhood and adulthood predictors of obesity and metabolic syndrome. *Intern Emerg Med* 11, 175–182 (2016).
3. Marsh, H.W. & Craven, R.G. (2006). Reciprocal effects of self-concept and performance from a multidimensional perspective. *Perspectives on Psychological Science*, 1(2), 133-163.
4. Barlow J, Underdown A. Promoting the social and emotional health of children: where to now? *J R Soc Health.* 2005;125(2):64–70.
5. Arvinen-Barrow, M., DeGrave, K., Pack, S., & Hemmings, B. (2019). Transitioning out of professional sport: The psychosocial impact of career-ending non-musculoskeletal injuries among male cricketers from England and Wales, 13(4), 629–644.
6. Holopainen R, Simpson P, Piirainen A, et al. Physiotherapists’ perceptions of learning and implementing a biopsychosocial intervention to treat musculoskeletal pain conditions: a systematic review and metasynthesis of qualitative studies. *Pain.* 2020.
7. Bruner MW, Balish SM, Forrest C, et al. Ties That Bond: Youth Sport as a Vehicle for Social Identity and Positive Youth Development. *Res Q Exerc Sport.* 2017;88(2):209-214.
8. Stambulova, N. (2003). Symptoms of a crisis-transition: A grounded theory study. In: N. Hassmén (Ed). Svensk idrottspsykologisk förening (pp. 97–109). Örebro, Sweden: Örebro University Press.
9. Wiese-Bjornstal, D. M., Smith, A. M., Shaffer, S. M., & Morrey, M. A. (1998). An integrated model of response to sport injury: Psychological and sociological dynamics. *Journal of Applied Sport Psychology*, 10(1), 46-69.
10. Arvinen-Barrow, M., Hurley, D., & Ruiz, M. C. (2017). Transitioning out of professional sport: 537 The psychosocial impact of career-ending injuries among elite Irish rugby football union 538 players. *Journal of Clinical Sport Psychology*, 10(1).
11. Corbin J, Strauss A. Managing chronic illness at home: Three lines of work. *Qualitative Sociology.* 1985;8(3):224–247.
12. Duncan, B. L., Miller, S. D., Wampold, B. E., & Hubble, M. A. (Eds.) (2010). *The heart and soul of change: Delivering what works in therapy.* Washington, DC: American Psychological Association.
13. Schwartz, S. J., Luyckx, K., & Vignoles, V. L. (Eds.) (2011). *Handbook of identity theory and research.* New York, NY: Springer.

High Prevalence of Musculoskeletal Pain Among Esports Athletes

- Udgivet 15. juni 2020

Authors

Yona T¹, Lindberg L², Østergaard LD³, Lyng KD⁴, Rathleff MS^{3,4,5}, Straszek CL^{2,3,4}.

¹ The Israeli Physiotherapy Society, Tel-Aviv, Israel

² Department of Physiotherapy, University College of Northern Denmark (UCN), Aalborg, Denmark.

³ Department of Health Science and Technology, Aalborg University, Aalborg, Denmark

⁴ Center for General Practice in Aalborg, Department of Clinical Medicine, Aalborg University

⁵ Department of Physiotherapy and Occupational Therapy, Aalborg University Hospital

Corresponding author: Tomer Yona, Twitter: @Tomer_PT, Email: tomeryona@gmail.com

Phone: +972547841186

Esports- rapidly evolving and highly demanding

Esports is a new and rapidly evolving sports discipline with a growing number of athletes engaged in structured practice and competitive tournaments with extensive money prizes.

Esports has many similarities with traditional sports, like football, handball, or athletics [1]. It includes interaction with other members or competitors, centered around competition, and requires high concentration and a specific skillset. Notably, the lack of physical activity is what makes esports stand out compared to more traditional sports. Nonetheless, many esports athletes experience musculoskeletal pain.

Becoming a skilled esports athlete requires extensive practice, and several studies suggest that professional esports athletes, on average, practice between 3.4-5.2 hours/day, corresponding to 25-35 hours/ week [2,3]. This number may increase with up to 10 hours/day before a competition, with some tournaments consisting of up to three hours non-stop, intensive gaming [4]. Such high workloads are likely to have an impact on adolescents engaged in esports.

Musculoskeletal pain in esports

Research regarding esports is rapidly evolving – In the most extensive cross-sectional study to date, Lindberg et al. (2020) surveyed 188 Danish esports athletes, aged 15 to 35, and participating in structured esports, and found that 42% of esports athletes suffer from musculoskeletal pain [3]. Previous smaller reports support this surprisingly high prevalence by showing approximately 2 out of 5 (40%) esports athletes suffer from either back or neck pain[4]. Not surprisingly, upper limb pain is also common,

with approximately 30-36% reporting shoulder or wrist pain [3,4]. Preliminary research suggests that long gaming-session may be one of the risk factors for musculoskeletal pain in adolescents [5,6].

How does the high prevalence of musculoskeletal pain in esports impact young athletes? A body of literature document that adolescents reporting pain also describe decreased quality of life [7], reduced sleep time and quality of sleep [8,9], and suffers from depression and anxiety [10,11]. Specifically, esports athletes with musculoskeletal pain report reduced sleep time and quality; 26% of them sought medical attention, and 16.3% used analgesics, resulting in 5.6 fewer hours of training per week [3].

Pain during youth is also associated with a variety of issues presenting later in life, including; smoking, obesity, poor mental health, poor sleep, and physical inactivity. Of particular concern is the current uncertainty regarding treatment methods for musculoskeletal pain in adolescents [12].

These numbers suggest that the high prevalence of pain in esports has an impact and should not be neglected. With the rapid growth in the number of esports athletes, health professionals can only expect an increase in adolescents' consultations due to esports-related pain complaints.

An office work sport?

The physical demands of esports may be somewhat similar to that of office-based work (with an added stress of competitive sport). Prolonged use of a stationary work is associated

with a higher prevalence of wrist and hand symptoms [13], and prolonged sitting for 2 hours has shown to increase discomfort in all body areas [14] and increase the number of creative problem-solving errors when performing computer work [14]. Previous research suggests that exercise might be the first line of treatment for work-related musculoskeletal disorders and can reduce pain [15], along with new episodes of neck [16,17] and shoulder [17] pain.

Understanding the work demands of office-based work may be one of the key elements to understand the pain complaints among esports athletes and could be a promising approach to prevent and manage pain associated with esports. However, additional research is required to understand this in the context of esports. Currently, the knowledge regarding specific demands of popular esports games, specific medical needs of the young athletes, and the impact of pain on their performance is scarce.

A Call for Action

Our results [3] constitute an unanswered need; as the popularity of esports continues to evolve into a massive phenomenon, and the number of professional and amateur athletes increases rapidly, it is paramount to provide proper medical attention to esports athletes. However, the knowledge concerning specific and personalized management strategies for this sport is still lacking [18].

Specific exercise and physical activity interventions are known to be one of the first-line treatments for office-based workers with musculoskeletal complaints [15–17]. The question remains if this approach can be tailored and implemented in the esports community.

Together with the athletes, coaches, and parents, we need to address the specific [19] needs of esports, e.g., assessing common injuries for different types of games and gaming consoles, the different modes of play, and different demands during the season (Figure 1).



Figure 1

Based on this knowledge, we can start to develop evidence-inspired strategies to support esports athletes to decrease the risk of musculoskeletal pain, and support those with musculoskeletal pain.

Until further evidence arises, we suggest that clinicians working with esports athletes consider the specific demands of esports, ergonomics during play, and encourage physical activities among this population.

References

1. Rosell Llorens M. eSport Gaming: The Rise of a New Sports Practice. *Sport Ethics Philos.* 2017;
2. Kari T, Karhulahti VM. Do e-athletes move? A study on training and physical exercise in elite e-sports. *Int J Gaming Comput Simulations.* 2016;
3. Lindberg L, Nielsen SB, Damgaard M, Sloth OR, Rathleff MS, Straszek CL. MUSCULOSKELETAL PAIN IS COMMON IN COMPETITIVE GAMING: A CROSS-SECTIONAL STUDY AMONG 188 DANISH ESPORT ATHLETES. Manuscript submitted for publication.
4. Difrancisco-Donoghue J, Balentine J, Schmidt G, Zwibel H. Managing the health of the eSport athlete: An integrated health management model. *BMJ Open Sport Exerc Med.* 2019;
5. Sekiguchi T, Hagiwara Y, Momma H, Tsuchiya M, Kuroki K, Kanazawa K, et al. Excessive game playing is associated with musculoskeletal pain among youth athletes: a cross-sectional study in Miyagi prefecture. *J Sports Sci.* 2018;
6. Sekiguchi T, Hagiwara Y, Yabe Y, Tsuchiya M, Itaya N, Yoshida S, et al. Playing video games for more than 3 hours a day is associated with shoulder and elbow pain in elite young male baseball players. *J Shoulder Elb Surg.* 2018;
7. Gonçalves TR, Mediano MFF, Sichieri R, Cunha DB. Is health-related quality of life decreased in adolescents with back pain? *Spine (Phila Pa 1976).* 2018;
8. Palermo TM, Law E, Churchill SS, Walker A. Longitudinal course and impact of insomnia symptoms in adolescents with and without chronic pain. *J Pain.* 2012;
9. Andreucci A, Campbell P, Richardson E, Chen Y, Dunn KM. Sleep problems and psychological symptoms as predictors of musculoskeletal conditions in children and adolescents. *Eur J Pain (United Kingdom).* 2020;
10. McLaren N, Kamper SJ, Hodder R, Wiggers J, Wolfenden L, Bowman J, et al. Increased substance use and poorer mental health in adolescents with problematic musculoskeletal pain. *J Orthop Sports Phys Ther.* 2017;
11. Holley AL, Wilson AC, Palermo TM. Predictors of the transition from acute to persistent musculoskeletal pain in children and adolescents: A prospective study. *Pain.* 2017;
12. Kamper SJ, Henschke N, Hestbaek L, Dunn KM, Williams CM. Musculoskeletal pain in children and adolescents. *Brazilian J Phys Ther.* 2016;
13. Jensen C, Finsen L, Søgaard K, Christensen H. Musculoskeletal symptoms and duration of computer and mouse use. *Int J Ind Ergon.* 2002;
14. Baker R, Coenen P, Howie E, Williamson A, Straker L. The short term musculoskeletal and cognitive effects of prolonged sitting during office computer work. *Int J Environ Res Public Health.* 2018;
15. Chen X, Coombes BK, Sjøgaard G, Jun D, O'Leary S, Johnston V. Workplace-based interventions for neck pain in office workers: Systematic review and meta-analysis. *Physical Therapy.* 2018.
16. Sihawong R, Janwantanakul P, Jiamjarasrangsi W. Effects of an exercise programme on preventing neck pain among office workers: A 12-month cluster-randomised controlled trial. *Occup Environ Med.* 2014;
17. Andersen LL, Jørgensen MB, Blangsted AK, Pedersen MT, Hansen EA, Sjøgaard G. A randomized controlled intervention trial to relieve and prevent neck/shoulder pain. *Med Sci Sports Exerc.* 2008;
18. AM, Brito J, Figueiredo P, Verhagen E. Virtual sports deserve real sports medical attention. *BMJ Open Sport and Exercise Medicine.* 2019.
19. van Mechelen W, Hlobil H, Kemper HCG. Incidence, Severity, Aetiology and Prevention of Sports Injuries: A Review of Concepts. *Sports Medicine: An International Journal of Applied Medicine and Science in Sport and Exercise.* 1992.

Cognitive load and fatigue in low load physical activities such as computer work or e-sport

- Udgivet 26. april 2020

Author

Afshin Samani

Sport Sciences – Performance and Technology, Department of Health Science and Technology, Aalborg University, Niels Jernes vej 12, 9220 Aalborg East, Denmark. Tel: 00 45 99402411. Email: afsamani@hst.aau.dk

Even at force levels of mostly below 10% of the maximum muscle force (e.g. computer work in the context of e-sport), prolonged low load physical activity may contribute to the development of musculoskeletal disorders (MSD). Fatigue is often regarded as a precursor of developing MSD. However, identifying fatigue development and designing effective interventions to impede fatigue in such activities have been under-studied. The problem becomes even more complex when the physical activity is concomitant with cognitive loading as the interaction of cognitive and physical aspects of an activity may alter the course of fatigue development. This article summarizes a set of three interconnected experimental studies which aimed at quantifying cognitive load alterations and fatigue during a standardized computer work and outlining the design of a smart fatigue alarm based on characteristics of oculomotor system.

Background

Prolonged low load physical activity such as computer work may contribute to the development of musculoskeletal disorders [1]. Such activities may develop fatigue [2] and fatigue is known as the precursor of developing MSD [3]. Concurrent physical and cognitive loading may exacerbate the fatigability and further intensify the adverse effects of fatigue [4]. Implementing a pausing regime during physical activities may reduce the adverse effects of fatigue on the human body [5]. To intervene in the pausing regime, fatigue should be monitored and the pause breaks should be implemented with proper timing [6]. However, the typical metrics of fatigue have not been fully successful in monitoring fatigue state in low load

physical activities (e.g., computer work) [2]. In a set of three interconnected experimental studies, the potentials of utilizing oculomotor system characteristics (i.e., oculometrics) to sense the altered levels of cognitive loading and fatigue during a standardized computer work were investigated [6–8]. Oculometrics are particularly of interest as they could potentially be recorded unobtrusively during physical activities. Furthermore, in the last study in this set, oculometrics were shown to be effective in implementing a smart fatigue alarm which could potentially be utilized to administer the pausing regime during physical activity [6]. Here, the results of these recent studies are summarized and discussed.

Procedures

In study I [7], the sensitivity of oculometrics (e.g., properties of fixations and saccadic eye movements) to altered cognitive loading and their between-days reliability were investigated. Thirty-eight participants took part in this study and performed an identical experimental protocol over two experimental days. The participants performed a standardized computer mouse task which was composed of a cyclic activity consisting of memorization of a dotted pattern and replication of the dotted pattern after a short wash-out period (Figure 1). At each experimental day, the participants performed the computer task in three sessions of five minutes, representing altered levels of cognitive loading, namely, low, medium and high. The cognitive loading was altered by changing the geometrical complexity of the dotted pattern to be memorized.

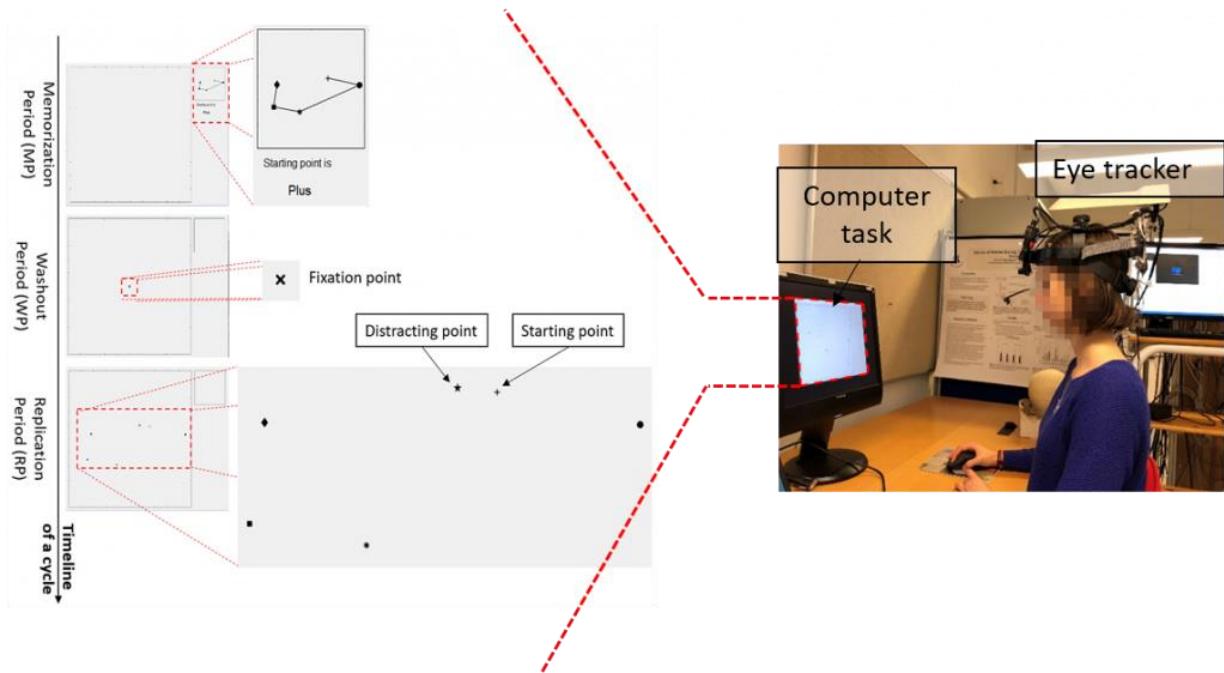


Figure 1. The experimental setup in study I to III and the timeline of a cycle of the standardized computer task

In study II [8], the same participant pool as in study I took part and the oculometrics, which were found reliable in study I, were studied during a prolonged session of 40 min of an identical computer work as in study I. After finishing every 20 cycles of the task (approximately 200 s), the participants scored their level of cognitive fatigue based on the Karolinska sleepiness scale (KSS) [9]. The changes of oculometrics with time-on-task were then compared with the temporal changes of KSS.

In study III [6], a computational model of fatigue state was developed and it allowed prediction of fatigue state based on the captured oculometrics. Twenty participants performed the computer task in two experimental sessions. Each session took 30 min and after every 20 cycles of the task, the participants scored their fatigue based on the KSS. Additionally, they could potentially take a micro-break of 25 s decided based on either their own discretion (manual session) or the alarming feedback generated by the fatigue alarm (automatic session). During the micro-breaks, the participants externally rotated their shoulders while holding an elastic band between the two hands and keeping the elbows in approximately 90° flexed and the shoulders up to 45° abducted. Moreover, the micro-break was accompanied by mindful breathing.

Data recording and analysis

With a sampling rate of 360 Hz, a monocular head-mounted eye tracker (Eye-Trac 7, Applied Science Laboratories, Bedford, MA, USA) was used in all studies to record gaze position, pupil diameter and blink moments (Figure 1). A motion-capture system (Visualeyez II system set up with two VZ4000 trackers, Phoenix Technologies Inc., Canada) tracked head movements and sent its information to the eye tracker to allow accounting for head movements. A data-driven algorithm was used to extract ocular events (i.e., saccades, fixations, or blinks). Based on the yielded output of the algorithm, the oculometrics were computed [10].

In study I, a long list of relevant oculometrics were tested and reliable metrics with sensitivity to altered mental load were chosen to be used in study II. Saccade peak velocity, saccade duration, the slope of line regressing peak velocity and amplitude of saccades (i.e. main sequence), fixation duration, blink duration, blink frequency and the mean of pupil dilation range (i.e. pupillary response) were utilized in study II to reflect fatigue with time-on-task.

The overall performance (OP) of participants carrying out the task was monitored in terms of the speed and accuracy of the pattern replication. The workload of the tasks in all studies was subjectively score by each participant based on a

computerized version of the National Aeronautics and Space Administration Task Load Index (NASA-TLX) [11]. Furthermore, KSS was scored on a scale from 1 to 9, corresponding to “very alert” and “very sleepy, fighting sleep,” respectively.

All three studies involved common statistical analysis. A repeated-measures analysis of variance was used to examine the effects of the three levels of mental load as the within-subject factor on oculometrics in study I and the time effect in study II. In study I, the relative and absolute reliability of the oculometrics were assessed using intra-class correlation coefficient ICC and the limits of agreement (LoA) obtained from Bland-Altman plots.

Results

In study I, saccade peak velocity, saccade duration and the main sequence decreased whereas fixation duration increased with increased cognitive load demand. These metrics also exhibited acceptable reliability scores (ICC>0.5 and normalized LOA below 20%). Metrics like pupillary response and blink frequency and duration were also highlighted as they have been shown to be reliable in a number of studies [12,13]. As expected, OP decreased and NASA-TLX increased with cognitive load. In study II, as expected KSS increased with time-on-task and this was associated with decreasing

saccade peak velocity, saccade duration and increasing pupillary response and blink frequency and duration as well as fixation duration with time-on-task. Study III revealed that the computational model yielded about 70% accuracy in identifying fatigue state. OP and KSS increased with time in both automatic and manual sessions but the increase in KSS was delayed in automatic session compared with the manual session. The participants reported lower loading demand in automatic session as NASA-TLX was markedly lower in the automatic session.

Conclusion

This set of studies confirmed the feasibility of the quantification of cognitive load and fatigue based on oculometrics during a functional computer task. The most insightful finding of this set of studies for practitioners was related to the contribution of oculometrics to planning the pausing regime during physical activity and showing that such a system could be more effective than self-triggered breaks in impeding fatigue.

Overall, this set of studies may shed light to the complex relationships between oculometrics, mental load, and fatigue and provide a practical approach for using eye tracking in the prevention of associated MSD risks in low load physical activities such as e-sport.

References

- 1 Ijmker S, Huysmans MA, Blatter BM, *et al.* Should office workers spend fewer hours at their computer? A systematic review of the literature. *Occup Env Med* 2007;**64**:211–22.
- 2 Yung M, Wells RP. Responsive upper limb and cognitive fatigue measures during light precision work: An 8-hour simulated micro-pipetting study. *Ergonomics* 2017;**60**:940–56.
- 3 Côté JN. Adaptations to neck/shoulder fatigue and injuries. In: *Progress in motor control*. Springer 2014. 205–28.
- 4 Srinivasan D, Mathiassen SE, Hallman DM, *et al.* Effects of concurrent physical and cognitive demands on muscle activity and heart rate variability in a repetitive upper-extremity precision task. *Eur J Appl Physiol* 2016;**116**:227–39. doi:10.1007/s00421-015-3268-8
- 5 Juul-Kristensen B, Søgaard K, Stroeyer J, *et al.* Computer users' risk factors for developing shoulder, elbow and back symptoms. *Scand J Work Environ Health* 2004;**30**:390–8.
- 6 Marandi RZ, Madeleine P, Omland Ø, *et al.* An oculometrics-based biofeedback system to impede fatigue development during computer work: A proof-of-concept study. *PLoS One* 2019;**14**.
- 7 Marandi RZ, Madeleine P, Omland Ø, *et al.* Reliability of Oculometrics during a Mentally Demanding Task in Young and Old Adults. *IEEE Access* 2018.
- 8 Marandi RZ, Madeleine P, Omland Ø, *et al.* Eye movement characteristics reflected fatigue development in both young and elderly individuals. *Sci Rep* 2018;**8**:13148.
- 9 Åkerstedt T, Gillberg M. Subjective and objective sleepiness in the active individual. *Int J Neurosci* 1990;**52**:29–37. doi:10.3109/00207459008994241
- 10 Nyström M, Holmqvist K. An adaptive algorithm for fixation, saccade, and glissade detection in eyetracking data. *Behav Res Methods* 2010;**42**:188–204. doi:10.3758/BRM.42.1.188
- 11 Sharek D. A Useable, Online NASA-TLX Tool. *Proc Hum Factors Ergon Soc Annu Meet* 2011;**55**:1375–9. doi:10.1177/1071181311551286
- 12 Borghini G, Astolfi L, Vecchiato G, *et al.* Measuring neurophysiological signals in aircraft pilots and car drivers for the assessment of mental workload, fatigue and drowsiness. *Neurosci Biobehav Rev* 2014;**44**:58–75. doi:10.1016/j.neubiorev.2012.10.003
- 13 Martins R, Carvalho J. Eye blinking as an indicator of fatigue and mental load—a systematic review. In: *Occupational Safety and Hygiene III*. 2015. 231–5. doi:10.1201/b18042-48

Fra rehabiliteringsforløb til idrætsforening – giver det overhovedet mening?

- Udgivet 6. september 2020

Forfattere

Thomsen S, Kristensen GDW, Jensen NWH, Agergaard S

Sport Sciences – Sports & Social Issues, Institut for Medicin og Sundhedsteknologi, Aalborg Universitet

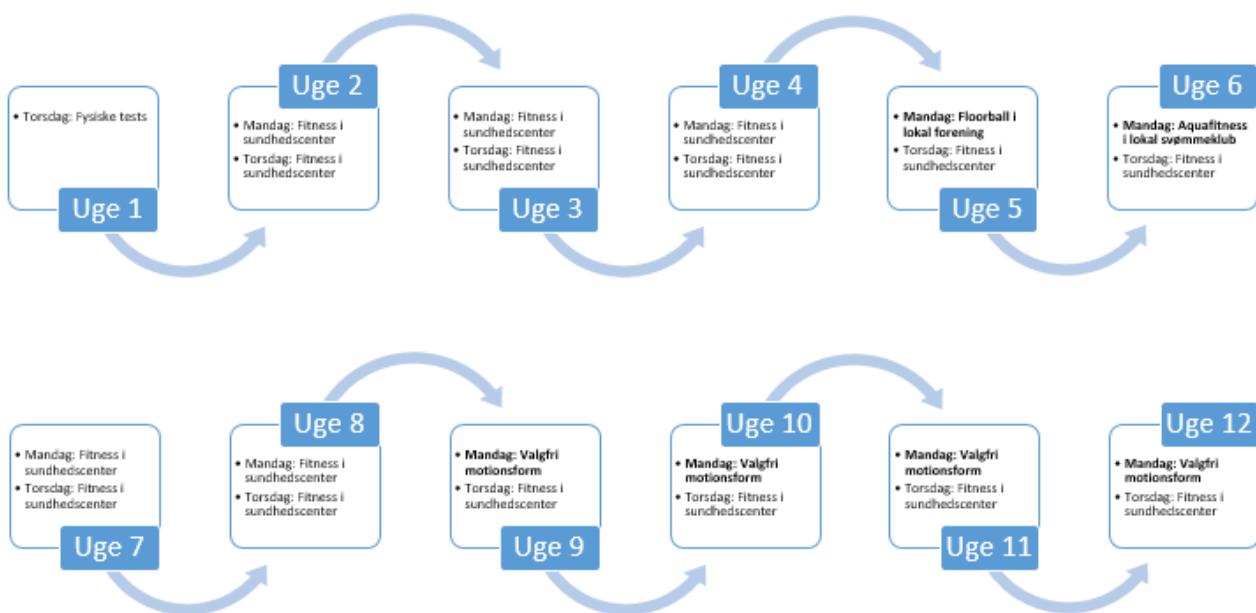
Baggrund

Det er velkendt, at regelmæssig motion bidrager til både forebyggelse og behandling af Type 2 diabetes (T2D) gennem blodsukkerregulering (1,2), og således også til forebyggelse af en række gængse følgesygdomme (3-5). I Danmark tilbydes personer med T2D eller prædiabetes oftest at deltage i kommunale rehabiliteringsprogrammer, der blandt andet introducerer dem for motions gavnlige effekter og giver praktiske erfaringer med bestemte motionsformer (6). De langsigtede effekter af sådanne rehabiliteringsforløb er imidlertid tvivlsomme, og i et nyligt litteraturstudie diskuterer vi, hvad årsagerne til disse udfordringer kan være, med særlig vægt på manglende støtte og struktur efter endt rehabilitering (7). Når personer med T2D indgår i et struktureret forløb bliver de støttet i nye motionsvaner, men når rehabiliteringen afsluttes er de i højere grad overladt til sig selv, og det pludselige fravær af den vanlige struktur og støtte formodes at være afgørende for de

efterfølgende udfordringer med at forblive fysisk aktiv (7).

På baggrund af de omtalte udfordringer arbejdes der i flere kommuner med brobygning til civile motionstilbud, eksempelvis lokale idrætsforeninger, og netop dette arbejde er interessant, fordi de civile motionsfællesskaber kan bidrage med støtte og struktur, og fordi de i modsætning til rehabiliteringsforløbene ikke er tidsbegrenede.

En sådan brobygning er forsøgt er i Brønderslev Kommune, hvor man har arbejdet med at skabe en glidende overgang til foreningsdeltagelse efter fremgangsmåden på figur 1. Her er det særligt de to besøg i idrætsforeninger i uge 5 og 6, samt de valgfrie aktiviteter i uge 9-12, hvor deltagerne blev opfordret til at genbesøge idrætsforeningerne, eller støttet i at finde andre selvvalgte motionsformer.



Teoretisk perspektiv

Vores undersøgelse tog afsæt i den medicinske sociolog Aaron Antonovskys perspektiver, der kort fortalt har fokus på at dreje arbejdet med sundhedsfremme væk fra sygdom, og hen imod den enkeltes evne til at håndtere de stressfaktorer, som en evt. sygdom (og livet i øvrigt) bringer (8). En god håndtering af stressfaktorer korrelerer med en høj grad af *Oplevelse af Sammenhæng* (OAS), hvilket omfatter at det enkelte individ opfatter de livssituationer, vedkommende indgår i, som værende *begribelige, håndterbare og meningsfulde* (9). *Begribelighed* relaterer sig til i hvor høj grad stimuli opleves som strukturerede, forudsigelige og forklarlige, *håndterbarhed* handler om den enkeltes oplevelse af at være i stand til at håndtere de omtalte stimuli på en hensigtsmæssig måde, og *meningsfuldhed* omhandler hvorvidt disse stimuli opfattes som udfordringer, der er værd at engagere sig i (8). Sammenholdes Antonovskys perspektiv med de åbenlyse helbredsmæssige fordele ved regelmæssig fysisk aktivitet kan et succesfuldt rehabiliteringsforløb forstås som et forløb, der blandt andet udstyrer deltagerne med viden og kompetencer, som hjælper dem til

Resultater & diskussion

Generelt oplevede deltagerne motion i sundhedscenterregi som både begribeligt og håndterbart:

"Vanligvis bliver jeg så stiv i læggene, når jeg erude at gå meget og sådan – eller går hurtigt. Men på cyklen her, så er det gået godt." (Steen)

"Min alder taget i betragtning så synes jeg jo, at jeg følger meget godt med i det. Det kan da godt være, det gør lidt ondt i knæene, men man kan vel ikke forvente at det skal være anderledes, når man laver sådan nogle øvelser." (Gert)

Dette skal ses i lyset af, at aktiviteterne på sundhedscentret for de fleste vedkommende var nogle, de havde stiftet bekendtskab med flere gange tidligere. Anderledes så det ud i forhold til floorball, hvor særligt dem der ikke deltog i foreningsbesøget udtrykte manglende begribelighed og håndterbarhed, mens det lod til at være bedre for dem, der havde været med:

"Nu har jeg aldrig prøvet det og jeg ved ikke hvor lang sådan en stav er, om det er hårdt for ryggen eller skidt for ryggen." (Ellen, deltog ikke)

"Jeg blev så forpustet, fordi jeg gik så meget op i det, at jeg kunne sgu ikke mere. Så siger jeg til mig selv, så nu skal du lige damppe lidt af og det er for hårdt det her." (Gert, deltog)

at *begribe, håndtere og finde mening i* fysisk aktivitet – eksempelvis i lokale idrætsforeninger.

Design & metode

Med afsæt i ovenstående foretog vi et case-studie med en gruppe personer med T2D i det omtalte forløb i Brønderslev fra januar til april 2019. Empiriindsamlingen bestod af ugentlige deltagende observationer under fysisk aktivitet på sundhedscentret, observationer under de skemalagte besøg i svømmehus og floorballklub, samt kvalitative, semistrukturerede, individuelle interview med 8 af de 11 deltagere på det rehabiliteringshold, vi fulgte. Observationer og interview var møntede på at afdække deltagernes oplevelser af deltagelse i fysisk aktivitet i sundhedscenter- og foreningsregi, med særligt fokus på deres OAS.

Efterfølgende foretog vi en hermeneutisk inspireret tematisk analyse (10) af den genererede empiri, der resulterede i 17 temaer med relevans for forståelsen af deltagernes oplevede *begribelighed, håndterbarhed og meningsfuldhed* i de undersøgte aktiviteter. Nedenfor præsenteres og diskuteres centrale aspekter af denne analyse.

Analysen tydede altså på, at *begribelighed* og *håndterbarhed* var knyttet til erfaring med de enkelte aktiviteter, og introduktion til idrætsforeninger formodes derfor at gøre det mere overkommeligt for deltagerne at indgå i disse.

Vores formodning om, at idrætsforeningers struktur kunne bidrage til langsigtet fysisk

aktivitet blev imidlertid udfordret i et tema, der handlede om forpligtelser. Her gav flere deltagere nemlig udtryk for, at de oplevede en positiv forpligtelse over for personalet på sundhedscentret, som hjalp dem med at være aktive, mens flere af de samme personer nævnte manglende lyst til at forpligte sig som direkte årsag til ikke at opsoge foreningstilbud:

Om rehabiliteringsforløbet:

"Jeg synes det er et flot tilbud, vi får. Det koster os ikke noget, og jeg har faktisk følt mig rimelig forpligtet til og komme fordi det var gratis." (Nora)

Om rehabiliteringsforløbet:

"Her føler jeg ikke et pres, men det er noget som jeg har fået tilbuddt, så det er jeg nødt til at være med på." (Steen)

Om foreningsdeltagelse:

"Altså hvis jeg går ind i noget, så skal jeg også komme. Og det er ikke bare sådan at komme hver anden gang... Du skal komme hver gang! Og derfor vil jeg ikke binde mig til mere." (Steen)

Samtidig var deltagerne dog meget bevidste om deres eget behov for et strukturerende element i forbindelse med fysisk aktivitet:

"Jeg er ikke struktureret nok til, at jeg bare kan gøre noget derhjemme, sådan fast, ej det er jeg ved Gud ikke." (Nora)

Fysioterapeuten taler om hjemmetræning til deltagerne, hvorpå Steen udbryder *"Hjemmetræning er bluff!"* (Observation)

At deltagerne generelt oplevede forpligtelse som noget strukturerende og støttende i forbindelse med fysisk aktivitet på rehabiliteringsforløbet, og snarere som en barriere i forbindelse med foreningsdeltagelse, udgør et interessant modsætningsforhold, der måske kan forstås i lyset af den tredje komponent i OAS, *meningsfuldhed*.

Mange af forløbets deltagere fandt umiddelbart mening i den fysiske aktivitets instrumentelle egenskaber, herunder aktivitet som middel til at opnå fysisk og psykisk velvære, vægttab og, mest udtaalt, lavere blodsukkerværdier:

"Jamen, jeg kan bruge det til at holde mit blodsukker nede. Og så måske, som jeg siger, holde benene og kroppen længere i gang, end hvis jeg bare sidder i lænestolen." (Svend)

"Altså først og fremmest vil jeg tage mig, og så selvfølgelig også holde styr på det blodsukker." (Nanny)

"Så det handler udelukkende for mig, om at få mit blodsukker ned, det er hele pointen." (Elisabeth)

Samtidig gav de fleste deltagere dog også udtryk for, at der var egenskaber ved de enkelte aktiviteter, der gjorde dem meningsfulde i momentet, herunder den sociale kontekst for aktiviteten og, for nogle, konkurrenceelementer:

*"Når der kommer en lidt, hvad kan man sige, kvik bemærkning indimellem, af en eller anden, jamen så er det ligesom ...
Så glemmer man, at det gør ondt." (Svend)*

"Når man spiller bold, så kommer konkurrencegenet op i én. Nu skal de sateme have en på goddagen, så vinder vi 10-0." (Gert)

For flere deltageres vedkommende blev aktiviteterne fra foreningsbesøgene særligt fremhævet, når de gav eksempler på aktiviteter, der var forbundet med fornøjelse, mens disse aktiviteter i mindre grad blev forbundet med sygdomshåndtering.

Samtidig var de positive sociale oplevelser under foreningsbesøgene hovedsagligt knyttet til de andre deltagere fra rehabiliteringsforløbet, og ikke til personerne i foreningerne. En deltager gav eksempelvis udtryk for, at han ikke var i stand til at vurdere den sociale kontekst omkring floorballklubben efter ét besøg:

"Det var vældig, vældigt fint, ikke. Men jeg kan ikke bedømme hvordan det er, hvis du melder dig til at fortsætte derude." (Svend)

Når ingen deltagere ved rehabiliteringsforløbets afslutning var interesserede i foreningsidræt på længere sigt, og mange var direkte afvisende, fortolker vi det som et udtryk for, at fysisk aktivitets instrumentelle egenskaber, herunder dets bidrag til sygdomshåndtering, var den primære kilde til oplevet meningsfuldhed for størsteparten af deltagerne. Endvidere vurderer vi, at kendskabet til de besøgte foreninger var utilstrækkeligt til at understøtte en meningsfuld social forpligtelse, der kunne bidrage til fremadrettet deltagelse i disse.

Selvom dansk foreningsliv traditionelt forbindes med ikke-instrumentelle motiver (11), og selvom det er rimeligt at stille sig kritisk over for en sygdomsfokuseret eller sundhedspolitisk drejning af den frivillige idræt, lader det til at de instrumentelle værdier ved deltagelse i fysisk aktivitet umiddelbart er centrale for personer med T2D. Således ser det ud til, at der bør oplyses grundigt om de sundhedsmæssige gevinster ved deltagelse i foreningsidræt, hvis personer med T2D skal hjælpes over dørtæsklen til idrætsforeningerne. Efterfølgende kan man så håbe, at andre aspekter af foreningslivet, eksempelvis frivillighed og fællesskab, med tiden bliver meningsfulde dele af deltagelsen.

Referencer

- 1 Tuomilehto J., Indstrom J., Eriksson J., Valle T., Hamalainine E. & Uusitupa M. Prevention of Type 2 Diabetes Mellitus By Changes in Lifestyle Among Subjects With Impaired Glucose Tolerance. *N Engl J Med* 2001;344:1343-1350.
- 2 Venables MC, Jeukendrup AE. Physical inactivity and obesity: links with insulin resistance and type 2 diabetes mellitus. *Diabetes/metabolism research and reviews* 2009;25:18-23.
- 3 Zanuso S, Jimenez A, Pugliese G, et al. Exercise for the management of type 2 diabetes: A review of the evidence. *Acta Diabetol* 2010;47:15-22.
- 4 Fong D, Aiello L, Gardner T, et al. Retinopathy in Diabetes. *Diabetes Care* 2004;27.
- 5 Tesfaye S. Neuropathy in diabetes. *Medicine* 2015;43:26-32.
- 6 Sundhedsstyrelsen. National Klinisk Retningslinje for Udvalgte Sundhedsfaglige Indsatser ved Rehabilitering til Patienter med Type 2 Diabetes. 2015.
- 7 Thomsen S, Kristensen GDW, Jensen NWH, et al. Maintaining Changes in Physical Activity among Type 2 Diabetics – A Systematic Review of Rehabilitation Interventions. *Scandinavian Journal of Medicine and Science in Sports* Forthcoming;Accepted upon revision.
- 8 Antonovsky A. *Helbredets mysterium*. : Hans Reitzels Forlag 2000.
- 9 Antonovsky A. The salutogenic model as a theory to guide health promotion. *Health Promot Internation* 1996;11:11-18.
- 10 Dahlager L, Fredslund H. Hermeneutisk analyse. : Munksgaard Danmark 2007:154-178.
- 11 Thing LF, Ottesen L. MacDonalidisering af den danske idrætskultur? 2008:89-92.



DANSK
IDRÆTSMEDICINSK
SELSKAB