Practising target shooting sport requires focused attention and motoric steadiness. Parental reports suggest that children with attention-deficit/hyperactivity disorder (ADHD) benefit from participating in target shooting sport in Danish Shooting Associations.

Aim: This study aims at examining if and to which extent target shooting sport in children with attention difficulties reduces parent- and teacher-reported severity of inattentiveness, hyperactivity, and impulsivity, and improves the children's well-being and quality of life.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Intervention</th>
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<tbody>
<tr>
<td>ADHD</td>
<td>Behavioral: Intervention group</td>
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</table>

Study Type: Interventional

Study Design: Allocation: Non-Randomized
Endpoint Classification: Efficacy Study
Intervention Model: Parallel Assignment
Masking: Open Label
Primary Purpose: Supportive Care

Official Title: The Influence of Participating in Target Shooting Sport on Inattentive, Hyperactive and Impulsive
Further study details as provided by University of Southern Denmark:

Primary Outcome Measures:
- Teacher-rated ADHD-RS-IV. [Time Frame: 3 years] [Designated as safety issue: No]
The total score on the relevant 18 items on symptoms of inattention, hyperactivity and impulsivity on the teacher-rated ADHD-RS-IV.

Secondary Outcome Measures:
- Qb-test. [Time Frame: 3 years] [Designated as safety issue: No]
Hyperactivity (distance and area) and inattention (reaction time variance and omission errors) as measured by the Qb-test.

- Parent-rated ADHD-RS-IV. [Time Frame: 3 years] [Designated as safety issue: No]
The total score on the relevant 18 items on symptoms of inattention, hyperactivity and impulsivity on the parent-rated ADHD-RS-IV.

- Teacher- and parent-rated SDQ. [Time Frame: 3 years] [Designated as safety issue: No]
The total scores on the teacher- and parent-rated SDQ.

- Child-rated KidSCREEN-27 [Time Frame: 3 years] [Designated as safety issue: No]
Quality of life as measured by the total score on the child-rated KidSCREEN-27.

- A casestudy consisting of interviews and observations [Time Frame: 3 years] [Designated as safety issue: No]
Interviews and observations will add to a phenomenological understanding of children’s participation and engagement in their daily life and will qualify an in-depth understanding of mechanisms of change.

Estimated Enrollment: 98
Study Start Date: January 2016
Estimated Study Completion Date: December 2018
Estimated Primary Completion Date: December 2017 (Final data collection date for primary outcome measure)
### Active Comparator: Intervention group

The intervention is organised in collaboration between the local school, the Danish Shooting Association, and the national DGI (The Danish Gymnastics and Sporting Organization). The intervention is available geographically nationwide. The children will practise target-shooting sport in local Shooting Association once a week during school hours for a period of 6 months. Selected schools are either special schools or municipal schools with special educational programmes for children diagnosed with either ADHD or severe difficulties of hyperactivity, inattention and impulsivity. Teachers accompany the children to the Shooting Association where the instructors meet them.

### No Intervention: Control group

The same target group as children in the intervention group. In the control group children are not practicing target shooting sport, neither in school or free time.

### Detailed Description:

Children with Attention Deficit Hyperactivity Disorder (ADHD) (DSM-5) are characterised by three core symptoms: inattention, hyperactivity and impulsivity. Approximately 2-3% of Danish school children are diagnosed with ADHD (Madsen, Ersbøll, Olsen, Parner, & Obel, 2015), and the prevalence in Denmark is about 5% (Dalsgaard, Nielsen, & Simonsen, 2013). Many children with ADHD experience difficulties in managing social relations, e.g. team sports, and are often excluded from leisure activities with other children. This can have an impact on their well-being and quality of life which to a high degree depend on whether they have friends and communities with peers (Riley et al., 2006). Almost 50% of children with ADHD experience the core symptoms in adulthood, and many develop psychological and social problems (Dalsgaard, Mortensen, Frydenberg, & Thomsen, 2013) and are at risk of premature death (Dalsgaard, Ostergaard, Leckman, Mortensen, & Pedersen, 2015). The NICE guideline (National Collaborating Centre for Mental Health, 2009) recommends a combination of pharmacological and psychosocial treatment (multimodal treatment approach) for children aged 6-18 years, to remedy other symptoms than ADHD core symptoms. A growing focus on the benefits of sports activities, yoga and mindfulness suggests that physical activity may have a positive impact on children and young people with ADHD (Cerrillo-Urbina et al., 2015; Kang, Choi, Kang, & Han, 2011; Haydicky, Wiener, Badali, Milligan, & Ducharme, 2012; van der Oord, Bogels, & Peijnenburg, 2012; van de Weijer-Bergsma, Formsma, de Bruin, & Bogels, 2012).

The sport of Target shooting can be regarded as a type of mental training in which the athlete uses techniques breathing to calm down, focus and improve attention. Mind and body must be in complete balance and the techniques used are similar to those used in meditation (Jeppesen & Pensgaard, 2006). Furthermore, regulations apply to the Danish Shooting Associations, in combination with the way the target shooting sport is practiced in Denmark is associated with fixed physical boundaries, clear rules and a distinct structure for the activity. Furthermore, it is a sport where the adult instructor always is very close to the child, and it is custom for the instructor gives instructions in a calm, structured and concise manner. Thus, target-shooting sport has implicitly features elements that can be considered protective environmental factors for the inattentive child and thus may contribute to reduce ADHD-symptoms and strengthen the child's well-being and quality of life. In 2012, the Danish Gymnastics and Sporting Organization (DGI) initiated a sports project, where children with ADHD or similar symptoms of inattention, hyperactivity and impulsivity practiced target-shooting sport in Danish Shooting Associations, during schooltime, for 6 months.
Association. The evaluation showed, that the children became more concentrated and focussed during the training (Maansson, 2015). Based on this experience, this study has been initiated. However no studies have investigated the effect of target shooting sports for children with difficulties with inattention, hyperactivity and impulsivity.

The main aim of this study is therefore to investigate the influence of participation in target shooting sports in Danish Shooting Association for children having difficulties with inattention, hyperactivity and impulsivity.

**Eligibility**

Ages Eligible for Study: 10 Years to 14 Years (Child)

Genders Eligible for Study: Both

Accepts Healthy Volunteers: No

**Criteria**

**Inclusion Criteria:**

Children following criteria: Age 10-14 years, either ADHD diagnosis or selected by school staff or school psychologist to show distinct difficulties with inattention, hyperactivity and impulsivity, which affects the child's school attendance. If the child receives pharmacological treatment for ADHD and the treatment is expected to be stable during the intervention period.

**Exclusion Criteria:**

Children showing a physical visual handicap or severe symptoms of current mental health difficulties such as psychosis or suicidal ideations or impulses are not included.

**Contacts and Locations**

Choosing to participate in a study is an important personal decision. Talk with your doctor and family members or friends about deciding to join a study. To learn more about this study, you or your doctor may contact the study research staff using the Contacts provided below. For general information, see Learn About Clinical Studies.

Please refer to this study by its ClinicalTrials.gov identifier: NCT02898532

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Responsible Party: Annegrete Maansson, PhD-student, University of Southern Denmark

ClinicalTrials.gov Identifier: NCT02898532  History of Changes

Other Study ID Numbers: SDU-SUN-VEK20130134

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Individual Participant Data

Plan to Share IPD: Undecided

Keywords provided by University of Southern Denmark:
Children, ADHD, target shooting sport

ClinicalTrials.gov processed this record on September 12, 2016