

## Sport and physical activity: Facilitating interventions with young people living with an autism spectrum disorder

### Authors' Contribution:

A - Study Design  
B - Data Collection  
C - Statistical Analysis  
D - Manuscript Preparation  
E - Funds Collection

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### Abstract

Young people living with an autism spectrum disorder (ASD) have less access to sports and physical activity. Even when they do, the instructors do not always have the training to include them adequately. This study aimed to identify barriers that young people with ASD may face and strategies to overcome these barriers. In order to meet the objectives of the study, semi-structured interviews were conducted with young people, parents, and caregivers. Then, a qualitative analysis of the interviews has allowed the identification of three types of barriers: related to ASD, related to the physical and social environments, and related to the physical activity itself. Three categories of coping strategies have also been identified by the participants. In order to help reduce the barriers, one should focus on the social environment, the activity, and communication strategies. This study confirms previous research and shows that there are effective ways to intervene with young people living with ASD in order to optimize their integration in sports and physical activity and that it can be done with little resources.

**Keywords:** Sport, Autism spectrum disorder, Physical activity, Leisure

## INTRODUCTION

Sports and physical activities provide multiple benefits for participants [1,2]. Participating in sports and physical activity has physical, psychological, cognitive and social benefits for everyone, including young people with autism spectrum disorder [1,3]. Sports and physical activities are in concordance with the adoption of a healthy lifestyle. The acquisition of a healthy lifestyle in young individuals is a well-established concern. Physical inactivity among children and adolescents is a real public health issue. More than one-third of a young person's daily movements are done in the course of sedentary activities [4]. In the Canadian province of Quebec, 47.5% of boys and 64.7% of girls are subject to overweight problems and diseases related to a sedentary lifestyle (5). On top of that, the percentage of young people that spend more than two hours a day doing sedentary activities like watching television or playing video

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games increases with age [4].

The situation of young people living with a disability is even more alarming. Many studies have shown that they have a more sedentary lifestyle than those without limitation [6, 7]. As a matter of fact, they mostly engage in solitary and passive leisure activities [6]. Moreover, they depend more on their parents than young people without limitations for planning, transportation, and costs related to the activities [6].

Much literature exists regarding youth with a disability and the benefits of physical activity and sports [1,6,8,9]. The present article examines the literature on physical activity and sports and, more specifically, on young people with ASD. Young people living with an autism spectrum disorder are more affected by a sedentary lifestyle than young people without limitation because of the social, behavioral and physical challenges they may experience [10, 11].

The prevalence rate of autism spectrum disorder is increasing worldwide [12]. More efficient screening and some environmental conditions may explain this increase. In 2013, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) changed its classification criteria for autism spectrum disorder, which now includes three disorders, namely Autistic Disorder, Asperger's Disorder, and Pervasive Developmental Disorder Not Otherwise Specified [13]. According to the DSM-5, the diagnostic criteria for autism spectrum disorder are:

- 1) Persistent deficits in communication and social interaction;
- 2) Restricted, repetitive patterns of behavior, interests, or activities;
- 3) Symptoms must be present in the early developmental period;
- 4) Symptoms cause significant impairment in social, occupational, and other areas;
- 5) These disturbances are not due to intellectual disability.

According to many studies, one in a hundred people lives with autism spectrum disorder (ASD) [12,14,15]. In Quebec, it is the most reported disorder among students living with a disability (one in five) [16]. In light of these statistics, it is relevant to promote an active and healthy lifestyle for these young people despite the fact that they are limited. Furthermore, a young person with an autism spectrum disorder is 40% more likely to be obese than one without limitation [10].

In Quebec schools and community settings, facilitating and limiting factors related to the practice of sports and physical activity among young people with a disability have been evaluated and analyzed [17]. The practice environment and instructorship are significant inclusion factors for young people with a disability. A safe, attractive and easy-to-access environment has a positive impact on the practice of physical activity [18]. Nevertheless, young people with ASD may also face barriers when participating in sports and physical activity [19]. They may be related to ASD [20], the physical environment [21], the social environment [22], or the activity itself [23,24]. Indeed, the non-apparent aspect of ASD and social perception of it affect the quality of the instructorship [25]. As a matter of fact, the teachers and coaches are not always informed of the condition of the young people for which they are responsible and they may not have been trained to adapt their coaching to the reality of these young people [17]. They may not have the knowledge, openness or resources to properly integrate a young person in their group [26]. Hence, it is relevant to give them tools so they can intervene more adequately with young people living with a disability including ASD. The social environment also involves other young people in the group [22]. The practiced activity leads young people to interact and negative reactions to the behavior of the young TSA [23] may occur. Thus, parents often put a lot of time, energy and resources to find an activity and a suitable environment for their child with ASD [27].

Faced with this problem, it is important to find ways to improve young healthy lifestyles for those with ASD. Helping guides have been elaborated to help deal with young people with

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intellectual, hearing, language, and motor impairments as well as ASD. This article presents the results of the research that lead to the elaboration of one guide that intends to facilitate interventions with young school-aged people (14 and more) with ASD during sport and physical activity.

The objectives of this research are to identify the barriers young people with ASD may face during sports and physical activity and to identify means to overcome these barriers and enhance the integration of these young people.

## METHODS

As for the research method, a review of the literature on facilitating and limiting factors for the participation of young people with ASD in sports and physical activity as well as on proposed measures to support their participation has been performed. Secondary analyses were also performed on quantitative data relating to young people with ASD from a larger study on sports participation of young people with limitations. In addition, qualitative data has been gathered from parents, young people, and caregivers.

The literature review was performed by considering the following key words: Leisure, Physical activity, sports and autism spectrum disorder. The databases searched were CINAHL, Medline and PsychINFO. Altogether, 77 documents were identified and 45 were selected for analysis. The articles were analyzed according to the following: picture of the situation, identified benefits, facilitating factors, limiting factors related to the practice of physical and sports activities by young people with ASD.

The quantitative data from an observation grid of youth experience with ASD in a context of physical and sports activities was considered in order to understand the specifics experienced by this clientele. This data was collected using an observation checklist validated for use with young people and adapted for youth with disabilities. This 'repeated' observation grid counted the type of activity, type of teacher mentoring, the dynamics between the young person and the group and the quality of the experience of the person with ASD. It required a 10-minute observation and was repeated throughout the course of physical activity and sports. In total, 10 young people with ASD were observed during 83 observation sessions. Descriptive analyzes as well as inferential analysis (chi<sup>2</sup>) were performed for quantitative data.

Semi-structured interviews were conducted as part of this research project. This method has been used and validated in many studies that gather data on people living with a disability [17,20]. It is more suitable when examining the issues in depth as it allows the obtention of a thorough understanding from the participant's point of view [21]. Semi-structured interviews were conducted with young people, parents, and caregivers in order to document the experiences lived by young people with ASD when engaging in sports and physical activity. Individual interviews were conducted at the workplace with the caregivers and at home with the young people and parents. They were about facilitating and limiting aspects of sports and physical activity that are related to the family, social, and physical environments in which the young person evolves. Built and natural environments, equipment, the presence of professionals, the attitude of people without limitations, emotional, psychological and economic aspects, existing information on young people living with a disability and healthy habits, procedures, and available programs, are all subjects that were addressed during the interviews with the caregivers and parents. An ethics certificate was delivered by the Université du Québec à Trois-Rivières for this study.

For the sake of this research, ten interviews were conducted with four young people, three parents, and three caregivers. Parents were recruited via social networks, and the young people and caregivers via professionals within the community system. The participants were

Table 1. Semi-structured sample description

Characteristics		N (%)
Young people		
Age	9 years old	1 (25%)
	16 years old	1 (25%)
	21 years old	2 (50%)
Sport practiced	Physical training	2 (50%)
	Soccer	2 (50%)
	Badminton	1 (25%)
	Running	1 (25%)
	Dancing	1 (25%)
	Football	1 (25%)
	Ball hockey	2 (50%)
	Swimming	1 (25%)
Parents		
Type	Mother of 1 child with ASD	2 (66%)
	Mother of 2 children with ASD	1 (33%)
Caregivers		
Profession	Special educator	1 (33%)
	School and social adaptation teacher	2 (66%)

informed of the objectives and signed a consent form. They participated on a voluntary basis and could withdraw at any time. The interviews lasted between 11 and 65 minutes. All interviewed parents were mothers of one or two children living with ASD. The young participants were aged between 9 and 21 and engaged in many individual and team sports. All caregivers had been working in the school system for many years. Table 1 describes the sample in greater detail.

The interviews were audio-taped and verbatim transcribed. Then, data were processed using NVivo 8 software. The interviews were analyzed separately by two researchers who then created a coding tree that presented the major topics addressed. Finally, they compared and discussed their analyses until they reached an agreement.

## RESULTS

### Barriers

Three categories of barriers emerged from the analysis of the interviews: related to ASD, related to the physical and social environments, and related to the physical activity itself.

Barriers related to ASD include repetitive, obsessional, or compulsive activities as well as communication and social interaction challenges. When engaging in sport and physical activity, a young person with ASD might have a hard time understanding a play, paying attention to the rules, anticipating, and elaborating good strategies. Some barriers may also be related to their gross motor function. Parents and caregivers say that some young people with ASD show a lack of coordination, balance, and strength compared with those without limitation. However, ASD manifests itself differently in each person, so a barrier for an individual may not be one for another. A parent illustrates this very well:

*"His brother moves a lot compared with [...] usually motor function is not that good in autistic people [...] But my son [name] could be part of the tactical squad of [city] as a spider-man [...] we do a lot of motor activities, we go to the park, we climb, we jump, we spin around [...] he has no problem with that, it's just that... his temper joins in and sometimes things happen and then [...] there's an escalation and it bursts"*

Coherence, stability and safety needs can also limit the participation of young people with ASD in sport and physical activity, especially when the activities are new or take place in a new environment with people they don't know. It is even more difficult for a young person with ASD to feel comfortable in such conditions. One of them explained it very well:

*"[A negative aspect] it's more at the beginning, when you don't know the sport very well, since nobody really shows you what to do, that's the most irritating [...] that's the only negative element, at first [...] when you're learning a sport that you don't know"*

Barriers related to the physical and social environments have also been identified. As for the physical environment, the barriers are mainly at the sensory level. The texture of a uniform, the feeling of a bathing cap on the head, or the ambient noise during a swimming class, are all examples of barriers identified by the parents and caregivers of young people living with ASD. A caregiver explains it well:

*"Being autistic doesn't necessarily mean you are limited, you don't have any physical impairment, so you don't need an access ramp or things like that, but sometimes, I don't know, just the neon ceiling lights bother them, they're not designed for them. They look perfectly normal physically, but they are very sensitive to sensory stimuli, it can be difficult".*

For young people with ASD, however, barriers in sports and physical activity are mostly related to the social environment. The attitude and reactions of coaches as well as that of other parents and young people affect a young person with ASD. The following excerpt shows the attitude of a mother during a practice:

*"When he played soccer last summer, it was difficult. There was a kid that was not nice to him. [...] It came from the parents' attitude. The mother was always apart from the others. [She kept saying that] our kids were crazy, senseless, that they were this and that".*

The integration within the group may also not be adapted to the young person's needs. Indeed, the coach may not adapt their classes to the young person with ASD's skills. Table 2 presents an overview of the barriers related to the physical and social environment which have a negative impact on the practice of sport and physical activity among young people with ASD.

Table 2. Overview of the barriers related to the physical and social environment which have a negative impact on the practice of physical and sports activities among young people living with an autism spectrum disorder.

Areas	Examples
Caregivers (coaches, teachers, educators, etc.)	Too focused on competitiveness Close-minded Lack of knowledge Lack of resources
Peers	Intimidation Lack of knowledge Lack of awareness Inadequate integration of the young person with ASD
Parents	Don't engage in sport and physical activity Lack of time Lack of energy Lack of resources
Others	Availability of activities Type of activity Elementary to secondary transition Lack of support

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In addition to the barriers related to ASD and the physical and social environments, some barriers are related to the physical activity itself and may even prevent the young people from participating. In fact, it can be difficult for young people with ASD when the activity is too intense or too competitive. In essence, the activity may not meet the interests or preferences of the young person.

### Strategies to reduce barriers

Nevertheless, the participants have identified means to reduce these barriers. With regard to the social environment, awareness and strategies to circumvent the difficulties are the main ones. Indeed, awareness must not only be raised among caregivers and peers, it must also be raised among all those who revolve around the young person, so that everyone learns how to live together. Communication between the parent and the caregiver is essential so that they know the strengths, weaknesses, and interests of the young person, as well as what acceptable behavior is and what is not. A parents explains it well:

*"What is important is the approach, it's to understand the problem because anyway [...] you can have two autistic people side by side, but they each have a unique way to learn [...] to tame the problem is also important, to get the general gist [...] to raise awareness, it's all about awareness".*

Many strategies to reduce barriers for the participation in sport and physical activity have been identified by the parents and caregivers. The type of activity, the practice context, and the level of difficulty are all elements that can be adapted so that the activity is more accessible to young people with ASD.

Table 3. Communication strategies that can optimize young people with ASD's participation in sport and physical activity.

Communication strategies	Examples
Grab their attention	Name the young person Make sure there is visual contact, if possible Limit ambient noise Support the message with gestures, mimes
Adapt the message, instructions, and Teaching	Give less information Give one instruction at a time Use concrete, known vocabulary Speak more slowly Show an example of what to do Avoid long explanations Give concrete examples Adopt a routine
Make sure the young person understands what is being said	Give them time to understand and answer the questions Allow them to repeat what was said Ask questions in order to make sure they understood
Reword explanations and teachings	Be redundant, repeat, and reword if needed Use visual cues (gestures, writings, drawings, pictograms)
Let the young people express themselves	Make visual support available Encourage the young people to make gestures when saying something Make sure you understand them by rewording Encourage all efforts and attempts

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By taking into account the young person with ASD's interests, sensory and motor particularities as well as their abilities, it becomes much easier to integrate them. As an example, a parent talks about a coach's initiatives:

*"Young people with ASD may not be motivated to participate in the activity. So [The coach] integrated superheroes in the soccer activities. The kids really enjoy it, we must give them a motivation. There are pictures of Spiderman and Ironman. She tells them to run, go around Ironman then come back. They must do it with the ball".*

Finally, a good way to reduce barriers is to develop communication strategies that allow the explanation of the physical activity to the young person with ASD in order for them to better understand it. Table 3 presents the communication strategies that emerged from the literature and the interviews.

## DISCUSSION

This study aimed to identify the barriers young people with ASD may face when engaging in sports and physical activity and to identify means to overcome these barriers. Hence, a review of the literature and the interviews with parents, professionals, and young people with ASD has been performed. Barriers related to ASD, to the social and physical environments, and to the physical activity itself have been identified. Strategies to reduce these barriers were also mentioned by the participants in this study.

The barriers related to ASD identified by the participants are the same that emerged from the American Psychological Association [15] and Massion's studies [20]. Difficulty understanding, concentrating and anticipating and developing game strategies are difficult elements for young people with ASD [2]. In addition, Obrusnikova *et al.*'s study [22] has shown that young people with ASD may lack strength, coordination, or balance, and that they may move more slowly than those without limitation. Coherence, predictability, and safety needs have been expressed in these results as well as in Brewster and Coleyshaw's research [11]. These needs can be barriers for participation in a new activity with strangers [28].

As for barriers related to the physical environment, our results confirm those of Ashburner *et al.* (2014) which show that these limitations are found primarily in the sensory, physical environment. Textures, lights and ambient noise are elements that can negatively affect the practice of sports and physical activity [21].

The social environment is an important element of our results and previous research. Coaches, other young people in the group, as well as parents, are those who influence a young person with ASD. Our results follow the same direction as those of Coyne and Fullerton [26] and Pan and Frey [23] by showing that the lack of resources, openness and coaches' knowledge are decisive in the inclusion of a youth in physical activity and sports. Peers are also determinants mentioned in our results and literature. Obrusnikova and Cavalier [22] highlighted the importance of educating peers in the group to avoid negative reactions. Obrusnikova and Miccinello [27] also identified personal and social barriers that have been raised by our participants. Their research shows that parents can be exhausted by all the work that must be done to find a suitable sports and physical activity for their children.

Our study points in the same direction as Zhang and Griffin's [24]. Indeed, the activity itself can be a barrier for young people with ASD. In fact, elaborated and hard-to-master sequences of movements, material that is hard to manipulate, or many rules to understand and remember, may make the activity too difficult [20,28]. The intensity of the activity and its competitive dimension are elements that have also been explored in Pan and Frey's research [23].

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The communication strategies identified by the parents and caregivers have been highlighted in the literature. Srinivasan and Colleagues (2014) provide recommendations that go along the same lines as this study. They propose strategies to help physical education teachers intervene with young people with ASD. Awareness of ASD is also an avenue addressed by participants and in the literature [27]. Solitary, gold dyad activities are the kind of activities privileged by the authors as well as by the parents and caregivers who participated in this research [23]. Peers in the group can also be facilitators by being helpers and instructors for young people with ASD [27,29].

This study has some limitations. The composition of the sample is the main one. Only professionals within the school system have been interviewed. It would have been interesting to obtain the opinion of those who work in community and municipal settings. Besides, only mothers and sons participated in this study. The experiences of fathers and daughters would have been relevant too.

## CONCLUSION

Conclusions emerged from the results of this study. Some personal, social and environmental barriers may be present during the practice of physical activity and sports. It is possible to facilitate interventions with young people living with an autism spectrum disorder during sports and physical activity by regarding the social environment and developing strategies to circumvent the difficulties. Here the most important strategies to remember are:

1. Know the strengths and weaknesses of the young person (e.g., their interests, fixations, distinctive features, what is acceptable and what is not);
2. Integrate the young person gradually into an activity (e.g., show them before, visit the facilities, start alone, then add participants);
3. Adopt a routine (e.g., warm-up period before the class/exercises);
4. Use a structure when transmitting messages (e.g., give short and precise instructions, make sure that the young person is looking at you, that they pay attention);
5. Promote consistency among all those who intervene with the young person; use the same strategies (e.g., same approaches, same ways to communicate with the young person);
6. To inform other participants of the reality of young people with ASD and be vigilant in reducing any form of intimidation or exclusion of the other participants.

These findings can be key notes for the parents and teachers to develop inclusive daily activities.

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