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Neurobiology of Play in Children with Autism Spectrum Disorder

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Abstract

This article aims to analyze the neurobiology of play in contexts of atypical development, with particular attention to the early years of life. It is based on the assumption that play is an essential element in a child's overall growth. Therefore, the peculiarities that play takes on in children with non- neurotypical development constitute not just an indicator clinically significant, but also a potential resource therapeutic in the context from the support activities in favor of children and families.

Keywords: Game; Autism; Autism Spectrum Disorder; Neurobiology

Game in children with autism: neurobiological peculiarities

In the course of the Typical development: play progressively evolves from the sensorimotor exploratory level to functional play, until reaching symbolic and role-play forms, reflecting the integrated maturation of motor, cognitive and socio-relational skills. Social interactions that are established in the playful context activate neural circuits implicated in theory of mind and empathic processes, involving in particular the temporo-parietal area and the medial prefrontal cortex [1].

Numerous studies they have It has been highlighted that children with Autism Spectrum Disorder (ASD) tend to show a reduced interest in symbolic and social play, preferring repetitive activities or the manipulation of objects (e.g. aligning or rotating them), rather than interacting with peers [2]. Differences in the way children with ASD approach play appear to be related to dysfunctions in the brain areas responsible for motor planning, cognitive flexibility, and attention. In conditions of typical development, as reported by Panksepp [3], play stimulates the mesolimbic system, promoting the release of dopamine and generating feelings of pleasure and motivation. This system not only incentivizes play behavior, but is also essential in reinforcing adaptive behaviors and building social connections. Scientific literature has also documented how play promotes neuroplasticity through various mechanisms: from the development of empathy, which facilitates the formation of new neural circuits, to the integration of emotional and cognitive components, which supports complex synaptic modifications [4].

Oberman and collaborators [5] have hypothesized That In children with ASD, the mirror neuron system—crucial for imitating and understanding the intentions of others—may be hypoactive or dysfunctional. This system is considered essential for social play, as it allows children to learn through observation and imitation. Furthermore, sensory atypia, i.e., altered sensitivity to stimuli and a reduced ability to modulate sensory input during play, are frequently observed in individuals with ASD. This may lead to a preference for activities That they provide stimulations specifics, such as movements or sounds repetitive [6].

In the game Sensorimotor: Children with atypical development tend to explore objects visually from unusual angles or using peripheral vision. This behavior, which can be observed as early as nine months, is associated with reduced social responsiveness in subsequent months and is an early indicator of the autistic phenotype. Children at risk for ASD also show a greater interest in rotating objects and, between nine and twelve months, show delays in grasping skills and a reduced propensity to intentionally drop objects. Unlike their typically developing peers, who progressively reduce the tendency to carry objects in the mouth, children at risk maintain or increase this behavior [7].

In the game functional, children with ASD show a duration of activity comparable to that of their peers, but with less complexity

and variability. The main difference concerns functional play oriented towards themselves or towards others (for example, directed towards an adult or a doll). This suggests that children with ASD may not fully understand, or not attribute value, to the idea that a play action can be directed towards another subject. Since this modality requires the presence of joint attention, its impairment may reduce the child's interest in interactions with people and objects [8]. Someone Interpretative hypotheses trace the reduction of functional play back to delays or anomalies in the development of grip types, which would affect the exploratory capacity of objects [9].

As far as regard The symbolic play, children with ASD show not only a reduced frequency of pretending behaviors, but also a lower originality and spontaneity [10]. According to the literature, approximately 55% of children with ASD do not show any form of symbolic play. When this is present, they tend to use mainly object substitution, rarely using puppets or figures as agents. active [11]. While While some children with ASD possess the ability to engage in pretend play, it only occurs in the presence of guidance or support, suggesting that the deficit may be more related to spontaneity than to competence per se. When asked to perform a symbolic play task, these children perform the tasks adequately, but the product it turns out Often schematic and not very clear flexible [12].

It is not yet clear whether children with ASD do not understand the nature of symbolic play (competence deficit) or whether, even if they understand it, they are unable to apply it independently (performance deficit). Spontaneous pretend play is generally considered an indicator of performance, while that structured represents an indicator of competence [13]. A further critical element in the play of children with ASD is the reduced "playfulness", understood as the ability to act for the pure pleasure of the activity. playful [14]. The severity of autistic symptoms is inversely correlated to the level of playfulness, with particular reference to internal control and the ability to frame, that is, to emit and interpret social signals during play. When symbolic play becomes more complex - for example through the substitution of objects - an improvement is observed. total from the playfulness, in particular in the dimensions related to the framework [15].

Conclusion

The game Play represents a dynamic and complex process, capable of simultaneously reflecting and shaping brain organization. In children with typical development, play promotes the maturation and integration of cognitive and social skills, following a well-defined developmental sequence. In children with atypical development, however, neurobiological differences significantly influence the ways in which play is expressed and internalized. Early recognition of qualitative alterations in play in children with ASD is a crucial diagnostic and therapeutic tool, allowing for the implementation of targeted interventions capable of enhancing socio-cognitive skills and promoting the child's harmonious development.

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