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ORIGINAL

# Use of screens in children under 2 years of age: its relationship in childhood neurodevelopment

## Uso de pantallas en menores de 2 años: su relación en el neurodesarrollo infantil

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## ABSTRACT

**Introduction:** childhood neurodevelopment is the process of development of the nervous system that results in the maturation of structures, the acquisition of skills such as attention, planning, memory, language, motor control, among others; and, finally, the formation of the individual as a unique person. For this, the presence of a stimulating and psycho-affective environment is important, in addition to essential genetic and nutritional aspects, since everything influences the production of neuronal synapses, resulting in greater integration of brain functions. In recent years, an alteration in these essential characteristics for neurodevelopment has been observed due to the use of screens at an early age, specifically before the age of 2 years. Because of this, the presence of Neurodevelopmental Disorders in boys and girls has been evident, which will be raised throughout this research work.
**Method:** carry out a systematic review from which neurodevelopment itself and the results associated with Neurodevelopmental Disorders due to the use of screens in children under 2 years of age will be understood. All information found relevant to the research question will be searched and read, creating a synthesis and its objective.
**Results:** It was observed that neurodevelopmental conditions are not immediate from the first moment that screens are used in children under 2 years of age, but rather manifest years later in key stages of growth, such as the beginning of kindergarten or beginning school.
**Conclusion:** the use of screens in children under 2 years of age is not indicated since it does not provide any favorable effect on development and hinders its normal process.

**Keywords:** Neurodevelopment; Screens: Neurodevelopmental Disorders; Brain Plasticity; Neuronal Synapse.

## RESUMEN

**Introducción:** el neurodesarrollo infantil es el proceso de desarrollo del sistema nervioso que tiene como resultado la maduración de las estructuras, la adquisición de habilidades como la atención, la planificación, la memoria, el lenguaje, el control motor, entre otras; y, finalmente, la formación del individuo como persona única. Para este mismo, es importante la presencia de un ambiente de estimulación y psico-afectividad, además de aspectos genéticos y nutricionales esenciales, ya que todo influye en la producción de sinapsis neuronales dando como resultado una mayor integración de las funciones cerebrales. En los últimos años, se ha observado una alteración en estas características esenciales para el neurodesarrollo debido a la utilización de pantallas a temprana edad, específicamente antes de los 2 años. A causa de esto, se ha evidenciado la presencia de Trastornos del Neurodesarrollo en niños y niñas, los cuales serán planteados a lo largo de este trabajo de investigación.
**Método:** realizar una revisión sistemática a partir de la cual se entenderá el neurodesarrollo propiamente

dicho y los resultados asociados a los Trastornos del Neurodesarrollo a causa del uso de pantallas en menores de 2 años. Se buscará y se leerá toda información encontrada relevante a la pregunta de investigación realizando una síntesis y el objetivo de la misma.
**Resultados:** se observó que las afecciones a nivel del neurodesarrollo no son inmediatas a partir del primer momento que se utilizan las pantallas en menores de 2 años, sino que se manifiestan años más tarde en etapas claves del crecimiento, tales como el inicio del jardín o inicio escolar.
**Conclusión:** la utilización de pantallas en menores de 2 años no está indicada ya que no brinda ningún efecto favorable en el desarrollo y dificulta el proceso normal del mismo.

**Palabras clave:** Neurodesarrollo; Pantallas; Trastornos del Neurodesarrollo; Plasticidad Cerebral; Sinapsis Neuronal.

## INTRODUCTION

Child neurodevelopment is a complex process involving several factors, including environmental, social, psycho-affective, nutritional, and genetic factors.[1,2] During the first years of life, the brain exhibits remarkable plasticity, allowing new neural synapses to form, leading to growth. This significantly influences social, cognitive, and emotional development and motor skills.

Given the speed at which children grow, we can highlight some milestones of neurotypical growth that can be expected at each stage:

- 0 to 6 months: the first 3 months are characterized by absolute dependence, followed by psychomotor changes, babbling, interaction, and exploration.
- 6 to 12 months: greater exploration due to the appearance of crawling, standing, language development with new words, pointing at objects, and putting everything in their mouths.
- 12 to 24 months: this is a key cognitive and social development stage. They can form sentences, although they still have some difficulty. They discover art, whether it be painting, colors, or books.
- 4 to 6 years: language, psychomotor, and cognitive skills are considered to be mastered; they express their thoughts, interact with other children, and are interested in doing so, and they are interested in drawing, dancing, and movement.
- 6 to 10 years: they establish themselves as independent individuals, develop specific interests, and increase their relationship with reality.
- From age 10 onwards, this stage is related to forming their personality and identity, along with the physical changes predisposing them to pre-adolescence.[3]

## METHOD

A systematic review of the literature, including medical articles, publications, and informational websites such as the Argentine Society of Pediatrics, Scielo, Elsevier, and PubMed, among others, related to the main topic, was conducted. A comparison was made, and information and data were collected, which allowed us to demonstrate, explain, and relate the results of the research question.

Exclusion criteria included children under two years of age with pre-existing conditions. Inclusion criteria were applied, referring to scientific articles or publications that included information on children who had used screens before the age of two and scientific articles or publications that included information on children over the age of four who had used screens at an early age, generating a comparison to then specify the results.

## RESULTS

After searching and reading articles and websites related to the research, it has been found that excessive use of screens for prolonged periods (more than 2 hours of exposure) can affect the brains of young children due to their immaturity and the ability to intervene in expected brain development negatively. It mainly affects the development of cognitive, motor, language, socio-emotional, learning, memory, and attention activities.[4]

It takes at least 18 months for the brain to develop enough to understand that symbols or pictures on a screen have a real-world equivalent, and sufficient maturity in attentional control and symbolic thinking has not yet been reached to transfer knowledge acquired through a screen to real-life application.[1]

When this development is interrupted or altered, we can discuss neurodevelopmental disorders related to alterations in memory, learning, language and attention, social interaction, and problem-solving. Among the most frequent and well-known are attention-deficit/hyperactivity disorder (ADHD), which is characterized by brief or limited attention spans and/or excessive hyperactivity with impulsivity inappropriate for age, and autism spectrum disorder (ASD), which is characterized by difficulties in developing normal social relationships, abnormal language use or no language at all, and restricted or repetitive behaviors.[5,6,7]

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Many of the characteristics of these disorders, combined with dyslexia and intellectual disability, usually become apparent before the age of 4 and are established before the age of 12. They become even more evident in primary school, in academic performance, and social activity between the ages of 6 and 12.

There may be warning signs of these developmental issues, for example, at 10 months, not responding to their name, not waving or babbling; at 15 months, not walking alone or saying any meaningful words, not pointing, or not being able to say phrases of more than two words; and at any age, wandering or engaging in repetitive behaviors, not smiling, or showing no interest in other people. Losing acquired cognitive, social, communicative, or motor skills is also a warning sign.[7,8]

## DISCUSSION

In conclusion, we can and should give greater importance to screen use in children under two years of age because of its future and possible complications in neurodevelopment, which have been evidenced and confirmed: the greater the exposure, the greater the difficulties.

Despite this, studies based on populations of young children and preschoolers show associations between excessive screen time and delays in cognitive, linguistic, and psychosocial skills, as well as an increase in behavioral problems. On the other hand, it has been found that playing with traditional toys is associated with the acquisition of a greater number of words and better language quality compared to screen use.[6,9,10,11]

Children should grow up in an adapted environment with the necessary stimulation, social interactions, and play. This environment allows for proper child development without the use of screens and without their distracting effect on development.

## CONCLUSIONS

Child neurodevelopment is a delicate and fundamental process that depends on multiple factors, including the child's environment. In this sense, screen use at an early age, especially before the age of two, can represent a significant risk factor for this development. The evidence shows that prolonged exposure to electronic devices can negatively interfere with key areas such as language, attention, memory, social skills, and motor development.

Promoting parenting based on human contact, traditional play, emotional bonding, and adequate stimulation is essential. These elements contribute positively to the child's overall development, promoting autonomy, creativity, learning, and socialization. This reinforces the need to raise awareness among families, health professionals, and educators about the effects that early and excessive screen use can have, with a commitment to healthy and harmonious growth during the early years of life.

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## CONFLICT OF INTEREST

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