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REVIEW ARTICLE

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ПСИХОМОТОРЛЫҚ ТЕРАПИЯ БАЛАНЫҢ ДАМУЫН ҚОЛДАУ ҮШІН ОҢАЛТУДЫҢ БАСЫМ ТӘСІЛІ РЕТІНДЕ: АРТЫҚШЫЛЫҚТАРЫ МЕН ӘРЕКЕТ ЕТУ ТӘСІЛДЕРІ

Доктор Северин Алонсо-Бекье[1]

[1] Психомоторлық терапевт-сарапшы, PhD, ISRP Париж, Франция, sbekier@isrp.fr, https://orcid.org/0009-0004-5654-6827

Түйіндеме

Алдыңғы мақалада автор нейродаму, даму бұзылыстарын ерте диагностикалаудың маңыздылығы және ерте ынталандырудың өлшенетін әсерлеріне назар аударды.Психомоторлы терапевттер-мұндай ерте араласуды жүзеге асырудың тамаша мамандары. Даму траекториялары тұжырымдамасы және ерте араласудың маңыздылығы баланың дамуының барлық қыр-сырын және өлшеу мен бағалаудың арнайы құралдарын білуді талап етеді. Психомоторлық функцияның негізін құрайтын сенсомоторлық және тоникалық тәжірибелерге сүйене отырып, психомоторлық терапевттер психомоторлық функцияларды реттеуге бағытталған. Бұл тәсіл байқалған бұзылулардың қарқындылығы мен салдарын азайту арқылы күтілетін дамудан ауытқулардың алдын алуға немесе шектеуге бағытталған. Сенсорлық интеграцияға, бұлшықет тонусына, қалыпқа және қозғалысты үйлестіруге ерте және құрылымдық әсер ету арқылы психомоторлы терапевт сондай-ақ қатар жүретін бұзылулардың пайда болуын болдырмауға, қатар жүретін аурулардың қаупін азайтуға және үйлесімді жалпы дамуға ықпал етеді. Осы тақырыпты жалғастыра отырып, бұл мақала баланың дамуын нақты қолдаудағы психомоторлық терапияның мақсаттары мен әдістерін нақтылауға арналған. Мақалада психомоторлық терапиядағы бағалау және диагностика процесі де ұсынылған.

Түйін сөздер: нейродаму, ерте ынталандыру, психомоторлық терапия, психомоторлық бағалау, икемділік.

ПСИХОМОТОРНАЯ ТЕРАПИЯ КАК ПРИОРИТЕТНЫЙ ПОДХОД В РЕАБИЛИТАЦИИ ДЛЯ ПОДДЕРЖКИ РАЗВИТИЯ РЕБЕНКА: ПРЕИМУЩЕСТВА И СПОСОБЫ ДЕЙСТВИЯ

Доктор Северин Алонсо-Бекье[1]

[1] Психомоторный терапевт-эксперт, PhD, ISRP Париж, Франция, sbekier@isrp.fr, https://orcid.org/0009-0004-5654-6827

Резюме

В предыдущей статье автор сосредоточилась на нейроразвитии, важности ранней диагностики нарушений развития и измеримых эффектах ранней стимуляции. Психомоторные терапевты — идеальные специалисты для проведения такого раннего вмешательства. Концепция траекторий развития и важность раннего вмешательства требуют знания всех тонкостей развития ребенка и специальных инструментов измерения и оценки. Опираясь на сенсомоторные и тонические переживания, которые составляют основу психомоторного функционирования, психомоторные терапевты целенаправленно воздействуют на регуляцию психомоторных функций. Этот подход направлен на предотвращение или ограничение отклонений от ожидаемого развития путем уменьшения интенсивности и последствий наблюдаемых нарушений. Благодаря раннему и структурированному воздействию на сенсорную интеграцию, мышечный тонус, осанку и координацию движений, психомоторный терапевт также помогает предотвратить возникновение сопутствующих расстройств, снижая риск сопутствующих заболеваний и способствуя более гармоничному общему развитию. В продолжение этой темы, данная статья призвана прояснить цели и методы психомоторной терапии в специфической поддержке развития ребенка. В статье также представлен процесс оценки и диагностики в психомоторной терапии.

Ключевые слова: нейроразвитие, ранние стимуляции, психомоторная терапия, психомоторная оценка, пластичность.

PSYCHOMOTOR THERAPY AS A PRIVILEGED APPROACH IN REHABILITATION TO SUPPORT CHILD DEVELOPMENT: BENEFITS AND MEANS OF ACTION

Dr Séverine Alonso-Bekier[1]

[1] Psychomotor therapist-expert, PhD, ISRP Paris, France, sbekier@isrp.fr, https://orcid.org/0009-0004-5654-6827

Abstract

In the previous article, the author focused on neurodevelopment, the importance of early diagnosis of developmental disorders, and the measurable effects of early stimulation. Psychomotor therapists are the ideal professionals to provide this early intervention. The concept of developmental trajectories and the importance

of early intervention require knowledge of all the subtilities of child development and specific measurement and assessment tools. Drawing on the sensorimotor and tonic experiences that form the basis of psychomotor functioning, psychomotor therapists intervene in a target-oriented manner to support the regulation of psychomotor functions. This approach aims to prevent or limit deviations from expected development by reducing the intensity and impact of observed disorders. Through early and structured action on sensory integration, muscle tone, posture and motor coordination, the psychomotor therapist also helps to prevent the onset of associated disorders, reducing the risk of comorbidities and promoting more harmonious overall development. In continuation of this theme, this article aims to clarify the objectives and methods of psychomotor therapy in the specific support of child development. The article also presents the process of assessment and diagnosis in psychomotor therapy.

Keywords: neurodevelopment, early stimulations, psychomotor therapy, psychomotor assessment, plasticity.

Correspondent-author: Dr Séverine Alonso-Bekier, Psychomotor therapist-expert, PhD, ISRP Paris, France
E-mail: sbekier@isrp.fr
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Introduction

As we illustrated in our preview article [1], the first years of life are a period of maximum brain plasticity**,** during which neural networks are built and stabilised in response to environmental stimuli [2]. Developmental trajectory models show that initial differences, if not compensated for, tend to widen over time (cumulative effect). Early intervention can therefore modify the trajectory by limiting the effects of risk factors (precariousness, toxic stress, screen exposure, educational deficiencies) and strengthening protective resources. These findings are supported by recent studies on brain plasticity and the ability of children to compensate for delays when properly stimulated [3-6].

Psychomotor rehabilitation mobilises brain plasticity by offering targeted situations and learning experiences that engage impaired motor, cognitive and psychosocial functions to reduce, compensate for or eliminate deficits. The type of intervention chosen is tailored to the results of psychomotor assessments. In each case, behavioural changes or a reduction in cognitive load when performing a task must be objectively measured through tests before and after the intervention.

Psychomotor therapy: what?

Although the terms ‘psychomotor’ and ‘psychomotor therapy’ were already in use in the second half of the 19th century, their conceptualisation as a fully-fledged therapeutic modality for rehabilitation really took shape in the 1950s, driven by the clinical work of Giselle Soubiran. Trained in physiotherapy, she practised at the Henri-Roussel Hospital in Sainte-Anne, Paris, in the child and adolescent psychiatry department headed by Professor Julian de Ajuriaguerra [7], a psychiatrist who was particularly open to interdisciplinary approaches.

The founding principle of their collaboration was based on the convergence of two complementary fields: one focused on the body and motor action, the other on the psyche and its dynamics. Both shared the conviction that the close articulation of these dimensions could give rise to a new field of clinical and applied scientific practice, capable of providing relevant therapeutic responses to patients.

Professor de Ajuriaguerra gave Giselle Soubiran a great deal of freedom in conducting her clinical research with hospitalised patients.

Giselle Soubiran's approach was characterised by a strong clinical requirement: to leave no patient without a therapeutic response and to strive to understand the specificities of each case in detail. She devoted many years to developing a specific assessment protocol and a structured therapeutic programme aimed at responding to the individual needs of these children and laying the foundations for psychomotor rehabilitation. Soubiran (1975) developed the psychosomatic relaxation technique that bears his name [8]. This was a new approach to the body that included the concept of relaxation. She also founded the School of Psychomotor Therapy (ISRP[1]), which today has four campuses in France[2] and trains nearly half of all qualified psychomotor therapists in France. This entire history is perfectly illustrated in Giromini's work [9], through the presentation of all Soubiran's contributions to psychomotricity.

[1] Higher Institute of Psychomotor Rehabilitation
[2] Paris, Marseille, Vichy and Metz

Psychomotor therapy (PMT) is a holistic approach to the patient which considers that the body and the mind are linked and that dysfunction of neurological functions can have a repercussion on the body (including behavior). Indeed, every human being uses their psychomotor system to interact with and adapt to the outside world. This system is composed of body scheme, space and time orientation, general and fine motor skills, executive functions, memory and muscle tone. If one of these elements is altered, by a pathology or an outside disturbance, a person will have difficulty adapting to its environment. One will start seeing consequences of this lack of adjustment and adaptation, which are only the symptoms of psychomotor problems. Hence, some physical disabilities may be a symptom of a disturbance within the psychomotor system, that requires specific assessment and specific techniques. Reversely, body injuries may also require an adaptation of the psychomotor system and require a specific psychomotor approach.

Psychomotor therapy: why?

The principle of psychomotor therapy is that work can be done on, or rather through, the body to perform rehabilitation on the psychomotor system and the neurological functions that are disabled or dysfunctional. The rehabilitation process will either fix a neurological function or use brain plasticity to use a combination of other functions to compensate a disorder. In parallel, it is also very important to strengthen the working functions, not only as a means of prevention, but also as a means of potentially compensating in the future the alteration of other functions.

Play is particularly important in psychomotor rehabilitation. Not only because it stimulates sensorimotor, cognitive and psychosocial functions (through discovery, creativity, problem solving, active sensorimotor experimentation, associated pleasure, etc.), but it also probably satisfies a natural appetite for discovery and exploration of new situations (present in both young animals and human children). The effects of exploration and play are even more significant when they are guided, which highlights the importance of the role of the psychomotor therapist in structuring sessions in such a way as to direct behaviour.

The basis of psychomotor development, which is the speciality of psychomotor therapist, is sensorimotor function. Continuing Piaget's work, Berthoz [10] considers proprioception to be a key sense, providing essential information about the position and movements of the body through sensory receptors in the muscles, tendons and joints. This sense allows us to anticipate and correct movements in real time, which is fundamental for complex actions such as walking or manipulating objects. According to Berthoz, Tsakiris or Metzinger [11, 12] the brain constantly integrates these proprioceptive signals with visual and vestibular (balance-related) information to construct a coherent image of space and movement.

Berthoz's work on proprioception, and the sense of movement has thus helped us understand the complexity of the interaction between the brain, the body and the environment, highlighting how the brain creates a dynamic and adaptive representation of the body in motion. This holistic and integrative approach is in line with the conceptual framework of psychomotor therapy.

In 2024, advances in neuroscience and cognitive science [13, 14] led to a deeper understanding of sensorimotor theory, which explores the relationships between sensory perception and motor action. This theory, taken up by Berthoz, suggests that perception is not simply the reception of sensory information, but is intrinsically linked to the ability to act. Current knowledge in this field highlights several key aspects:

Sensorimotor theory posits that perception depends on our ability to interact with our environment. Recent work shows that the brain uses internal models that predict the sensory consequences of actions, enabling it to anticipate and adapt. This is exactly what psychomotor therapists seek to achieve in early intervention. PMT’s expertise hence ranges from early childhood to old age, including a very wide variety of pathologies and disorders in between. It is one of the most comprehensive therapies in France and in the world. For all these reasons, the richness of the psychomotor rehabilitation approach means that it is cited in numerous recommendations by the French High Authority for Health[3] and in national’s plan[4].

The following table 1 presents a non-exhaustive summary of studies objectifying the use of PMT.

[3] Alzheimer’s disorder, migraine and chronic headache, sclerosis, serious anxiety disorders, health in the workplace, mental anorexia, pain, NDD (ASD, ADHD and learning disabilities), parkinson’s Disease, stroke, eating disorders...

[4] National alzheimer’s plan, national plan for ADHD and learning disabilities, pational neurodegenerative plan, national plan for rare disabilities, national autism plan, early childhood plan

Table 1. Evidence-Graded Summary Table – Psychomotor Therapy (PMT)

Population / Condition	Psychomotor Intervention	Main Outcomes	Documented Benefits	Grade Certainty of Evidence	Examples of References*
Typically developing children (preschool & school-age)	Structured psychomotor programs (gross/fine motor activities, body awareness, rhythm, play-based therapy)	Gross & fine motor skills, socio-emotional functioning	Improvements in motor proficiency; positive effects on emotional regulation, social interaction, and self-confidence	RCTs with limitations or strong observational evidence and/or non-randomized studies	Frazão et al., 2022; Viegas et al., 2023; Zimmer & Volkamer, 2021
Developmental Coordination Disorder (DCD)	Task-oriented psychomotor therapy, sensorimotor and balance training	MABC-2, BOT-2, balance, functional motor performance	Significant improvements in motor coordination, balance, and daily functional activities	Consistent results from well-designed RCTs or meta-analyses with minimal bias	Rameckers et al.2023; Gao et al., 2025; Blanck et al., 2019; Lichtsteiner et al., 2023
ADHD (children)	Movement-based and psychomotor interventions emphasizing motor regulation and structured physical activity	Motor control, attention, behavioral scales	Consistent improvement in motor skills; small and inconsistent effects on core attention symptoms	RCTs with limitations or strong observational evidence	Cerrillo-Urbina et al., 2015; Farran et al., 2020
Learning difficulties / graphomotor disorders	Fine motor and body-based psychomotor therapy (posture, visuomotor integration)	Handwriting quality/speed, visuomotor integration	Indirect improvements in handwriting and classroom motor tasks	RCTs with limitations or strong observational evidence and/or non-randomized studies	Feder & Majnemer, 2018; Overvelde & Hulstijn, 2019; Bonifacci et al., 2022
Adults with chronic pain (e.g., low back pain)	Body awareness therapy, relaxation, psychomotor re-education in a biopsychosocial model	Pain intensity, disability, quality of life	Reduced perceived pain, improved body awareness and functional capacity	RCTs with limitations or strong observational evidence and/or non-randomized studies	Mehling et al., 2018; Gard et al., 2020; Nijs et al., 2021
Functional Neurological Disorders (FND)	Psychomotor therapy within multidisciplinary rehabilitation (movement retraining, body perception)	Motor symptoms, functional outcomes	Clinical improvement in motor symptoms and engagement in rehabilitation	RCTs with limitations or strong observational evidence and/or non-randomized studies	Nielsen et al., 2020; Pick et al., 2022; Stone et al., 2023
Older adults	Psychomotor group	Balance, mobility,	Improved balance,	RCTs with limitations or	Keogh et al., 2021;

	interventions (balance training, dance, creative movement)	autonomy, well-being	physical functioning, and psychological well-being	strong observational evidence	Burkhardt & Brennan, 2022; Marmeleira et al., 2023
Across populations (transversal outcomes)	Individual or group psychomotor therapy	Self-esteem, emotional regulation, adherence	Increased self-efficacy, motivation, and therapeutic engagement	RCTs with limitations or strong observational evidence	Frazão et al., 2022; Zimmer, 2021; World Health Organization, 2023 (rehabilitation frameworks)

*[15-19]

Psychomotor therapy: how?

All care procedures begin with a precise and rigorous evaluation process.

According to Soubiran & Coste, "The practical modalities of the psychomotor examination aim at the methodical evaluation of the sensory, praxis, kinesthetics, gnosis and relational possibilities of the child, the adolescent or the adult". (1975, p.54).

The psychomotor assessment has the originality and the richness of being based on a mixed methodology articulating quantitative and qualitative data. Thus, it is composed of non-standardized tests whose objective is to allow a fine observation of one or several components of the psychomotor development, and of standardized and calibrated tests whose objective is to measure a precise skill. The psychomotor assessment tools depend on the age and the psychomotor function being assessed. Thus, each test will have its specificity. Some tests for children will evaluate more specifically the tonic function, others the levels of motor evolution or the relational capacities. The aim is always to objectify deviance from the norm.

The evaluation process is divided into several steps:

- Carrying out preliminary anamnestic research, either through an interview and/or consultation of the patient's file.
- To propose a set of tests allowing to approach the psychomotor development, except when the clinical situation does not allow it.
- Passing of one or several tests that will measure the skills related to the suspected disorders that motivated the assessment or suspected by the evaluator during the assessment.
- Adapting his or her proposals to the intrinsic characteristics of the patient (age, pathologies, fatigability, etc.).
- Drawing up a report describing the observations made, the results of the measurements taken, an explanatory summary of the patient's psychomotor functioning and the possible disorders identified, as well as a care plan if necessary.

At the end of this mixed evaluation process, one or more psychomotor disorders will be objectified, which will constitute the psychomotor diagnosis and therefore the indication for care that will have to be presented to the patient through a precise and complete report.

The disturbances in the psychomotor functions objectified by the tests of the assessment will make it possible to define the lines of work by establishing a therapeutic project with short and medium term, or even long-term objectives.

In their interventions, psychomotor therapists use either a top-down or bottom-up methodology, depending on their objectives.

As example, according to Habib [20], psychomotor therapists can treat dyspraxia and, by extension, all graphic disorders. The most used method is ‘bottom-up’ treatment, which strengthens the basic skills necessary for all motor functions, such as muscle tone regulation, balance and all sensory and perceptual-motor aspects. More recently, more pragmatic, ‘top-down’ methods have been developed that do not seek to act on the motor foundations but directly on motor activity through targeted tasks in everyday activities. We can resume that top-down approaches are the most effective for improving functional performance and participation [21, 22], but bottom-up approaches are useful as preparatory levers (regulation, body awareness,

motor prerequisites) [23, 24]. However today, integrative bottom-up + top-down models are now the recommended standard [25-27].

Whichever model is used, in PMT the body is hence the main tool, which is why rehabilitation uses and combines various techniques that engage the body. Therefore, the PMT can use the following techniques depending on the situation identified to mobilise the competences to be strengthened

- ✓ Sensory motor techniques and sensorial integration such as relaxation (passive and active), sensory self-awareness and sensory stimulation (water therapy, multisensory therapy, etc.) to better understand and control one's body and self. This help to stimulate proprioception, mobilise sensory memory, promote physical relaxation, influence perceptions and behaviour regulation, and stimulate interpersonal relationships and communication. The psychomotor therapist constantly adjusts their tone to that of their patient. They create a tonic-emotional dialogue, helping to restore impaired perceptions.
- ✓ Perceptive motor techniques such as danse, body expression (like theatre or painting) to work on interaction with the outside world. The main idea is to work on a combination of neurological and physical functions at the same time, to stimulate such functions and operate the neurological rehabilitation process. Used in psychomotor therapy in the form of games to create an appealing care environment for all ages, taking the form of motor games, cognitive games and symbolic games. These activities enable children to experiment and gain control of their bodies, space and rhythm through motor skills exercises, develop cognitive strategies, resolve emotional conflicts, develop creative imagination and their ability to think and express themselves, encourage socialisation.
- ✓ Relaxation techniques in order to calm down a patient, as it is well-known today thanks to modern neuropsychology that strong and uncontrolled emotions can interfere with a neurological rehabilitation process. Those techniques induce a change in states of consciousness and a decrease in alertness. It regulates and harmonises physiological and psychological functions with the aim of inducing physical and mental relaxation, promoting awareness, perception and representation of the body, and balancing and regulating muscle tone. Thus, relaxation has the ability to combine physiological effects (regulation of heart rate, increase in serotonin metabolites, regulation of breathing rate, regulation of muscle tone) and psychological effects (increased perceptual ability, relaxation of perceptual and emotional responses to the environment, increased empathy for others, decreased anxiety).
- ✓ Expressive and creative techniques: Techniques that bring out the possibilities for expression and communication with others in a dynamic and creative way. Through activities involving physical expression, dance, drama or mime (…), they enable people to acquire the skills to use their personal expressiveness as a tool for communication, symbolisation and creation, and act as a therapeutic mediator. They enable all psychomotor functions to be exercised: Muscle tone *through tonic regulation and tonic-emotional dialogue*, coordination/dissociation of movements, balance, freedom of movement and motor ease: *through improved precision of gestures,* body perception and representation: *enriched by awareness of guided and voluntary or improvised movement*, emotional and affective perceptions of self: *reshaped by self-discovery through improvisation,* spatial and temporal perception, orientation, structuring, adaptation and investment.
- ✓ Digital mediation: Techniques that promote expression and communication with others in a dynamic and creative way (VR, video games, digital tablets) [28]. Digital mediation helps to improve cognitive skills (attention, memory, logic, mental adaptation, planning), regulate muscle tone, adapt to space, and strengthen coordination (eye-hand, two-handed, motor) and praxis.

As emotions are very important in rehabilitation, PMTs make sure to know the patient personally to propose rehabilitation activities that they would best respond to. Each therapist must know their patient to provide the right rehabilitation tools that will enhance the chances of efficiency.

A psychomotor therapist will always have a very empathic approach to a patient and will always adapt their therapy to them. Communication with the patient is hence a very important tool. When communication is difficult, non-verbal communication is used by the psychomotor therapist, as well as body language and interpretation of muscle tone to evaluate a patient's level of tension.

PMTs always work in multidisciplinary teams, mostly with physical therapists, speech therapist and occupational therapists, each professional having their own field of expertise.

Conclusion

Psychomotor therapy is a global, holistic approach that is part of a multidisciplinary team working together to provide complementary care for patients, regardless of their age or condition. Current international evidence supports the clinical relevance of psychomotor rehabilitation as an effective intervention for improving motor functioning and associated psychosocial outcomes across developmental and clinical populations. Moderate- to high-quality studies demonstrate consistent benefits for children with developmental motor disorders, particularly when interventions are structured, goal-oriented, and embedded in

multidisciplinary care pathways. Beyond motor gains, psychomotor rehabilitation contributes to emotional regulation, body awareness, self-efficacy, and engagement in therapeutic processes, outcomes that are increasingly recognized as critical determinants of participation and quality of life. Contemporary models emphasize the integration of bottom-up bodily regulation and sensorimotor processes with top-down, task-oriented and participation-focused approaches, reflecting current neurodevelopmental and biopsychosocial frameworks. Despite methodological heterogeneity across studies, converging evidence indicates clinically meaningful effects when interventions are individualised and sufficiently intensive. It is important to note that psychomotor rehabilitation aligns with international rehabilitation frameworks that prioritise function, participation, and person-centred care. Through this paper, we hope to enrich rehabilitation care through the specificity of psychomotor therapy.

Conflict of interests

The author declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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ОБЗОРНАЯ СТАТЬЯ

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АУТИЗМ ЖӘНЕ ІШЕК: АУТИСТІК СПЕКТР БҰЗЫЛЫСТАРЫНДА ІШЕК ЖҰМЫСЫНЫҢ БҰЗЫЛУЫНЫҢ МИДЫҢ ҚЫЗМЕТІ МЕН МІНЕЗ-ҚҰЛЫҚҚА ӘСЕРІ

Канкина М.Д.[1], Халимгазиева Б.Х.[2], Бектембаева А.Е.[3], Зафидинқызы А.[4], Сәдебай Э.Ғ.[5]

[1] Психоневрология бөлімінің аға мейіргері, «Ұлттық балаларды оңалту орталығы» КеАҚ, Астана, Қазақстан, manzurakankina@gmail.com, https://orcid.org/0009-0001-9434-5389
[2] Психоневрология бөлімінің мейіргері, «Ұлттық балаларды оңалту орталығы» КеАҚ, Астана, Қазақстан, khalimgazieva@mail.ru, https://orcid.org/0009-0003-6138-7392
[3] Психоневрология бөлімінің мейіргері, «Ұлттық балаларды оңалту орталығы» КеАҚ, Астана, Қазақстан, aimane1968@mail.ru
[4] Психоневрология бөлімінің мейіргері, «Ұлттық балаларды оңалту орталығы» КеАҚ, Астана, Қазақстан, zafidinkyzy@mail.ru
[5] Психоневрология бөлімінің мейіргері, «Ұлттық балаларды оңалту орталығы» КеАҚ, Астана, Қазақстан, esadebai@gmail.com

Түйіндеме

Соңғы жылдары ғылыми зерттеулер ішек пен мидың арасындағы тығыз байланысты, әсіресе аутистік спектр бұзылыстары кезінде, дәлелдей түсуде. Бұл мақалада «ішек – ми» осінің теориялық негіздері, аутистік спектр бұзылыстары патогенезіне қатысатын метаболикалық және нейроиммундық механизмдер, заманауи диагностикалық және емдеу тәсілдері қарастырылған. Ішек микробиотасының