

# Remote rehabilitation in the times of covid-19: is it possible at distance? Comparision of neurodevelopmental therapist experiences

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**Abstract:**

On March 11, 2020, the World Health Organization declared the international outbreak of new coronavirus infection as a pandemic, due to the speed and scale of the infection around the world. Italy was one of the first European countries to adopt the restriction measures, progressively stricter and gradually extended to the entire national territory, with the consequent closure of any activity that is not strictly necessary, including rehabilitation health services. The provisions for continuing the treatments that cannot be postponed in phase 1 envisaged the use of telerehabilitation as a fundamental tool for

continuing neuropsychomotor therapy. In phase 2 and 3, however, the resumption of rehabilitation activities in the presence required the use of personal protective equipment, such as masks, visors and gloves, and the use of social distancing measures. However, in neuropsychomotor therapy of the developmental age, the body is a fundamental part, and the central element, with which the therapist comes into contact with the child, both through tonicdialogue and through the so-called non-verbal communication, with all its implications.

## **INTRODUCTION**

The COVID-19 epidemic is a pandemic in which a coronavirus has been identified as the cause of a respiratory disease outbreak. It was first detected in Wuhan, China. Coronavirus transmission occurs by air, fecal-oral or via fomites<sup>[1]</sup>. SARS CoV-2 is assumed to spread primarily from person to person via respiratory droplets generated by coughing and sneezing; therefore, the virus is highly contagious.



**Fig. 1 - Covid-19 collage**

## **ITALIAN CONTEXT**

The Italian Government declared a state of emergency on January 31, 2020 for six months<sup>[2]</sup>. Since that date, numerous Decree Laws of the President of the Council of Ministers and the Presidents of the Regions have followed one another, resolving in a first phase (phase 1) the closure of schools of all levels<sup>[3]</sup>, regions and home quarantine with the obligation of self-certification for travel<sup>[4]</sup> from one's home or residence. The restrictions were also applied in other areas, including health and rehabilitation, with the closure of rehabilitation centers and the suspension of all deferred treatments. The health emergency has therefore significantly affected the routine of families and, in particular, those of parents of children with disabilities, who with their characteristics of fragility and vulnerability are those most at risk in terms of achieving evolutionary stages. The public and private health services of Child Neuropsychiatry have had to adapt to the situation and build an alternative way to reach users and guarantee the continuity of interventions, transforming ordinary services into telemedicine.

## **REHABILITATION INTERVENTION STRATEGIES**

The strategies implemented for remote neuropsychomotor therapy are based on some fundamental practices of the neuropsychomotor habilitation and rehabilitation culture for the developmental age, which even in ordinary situations cover an area of integration to the outpatient activity, including the involvement of the family in the game sessions, the design of individualized activities and the use of tools for verifying proposals and responses. It should be clarified, however, that this method cannot and should not be interpreted as a substitute for outpatient intervention, but certainly an integrative dimension. In fact, neuropsychomotor therapy is certainly based on the therapeutic alliance founded with the child and the parent, but undoubtedly it is also based on the practical and empathic involvement, as well as motor and body, as an elective dimension, of the adult and of the Neuro and Psychomotor Therapist of the Evolutionary Age<sup>[5]</sup> in the game shared with the child. Furthermore, the methods of proposal and therapeutic adherence cannot disregard the tools in possession of both the families, regarding the IT devices available and materials available at home for therapeutic purposes, and the therapists, regarding the personal or corporate IT equipment. Computer programs, while having some advantages in terms of being able to capture the child's attention, to be captivating for logic and graphics, to be able to self-adapt the complexity of the task to the characteristics of the child, are not always so flexible to the operator, sometimes they are not yet available in Italian, but above all they often do not require the presence of an operator.

## **DEFINITIONS OF TELEMEDICINE AND**

## **TELEREHABILITATION**

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Telemedicine is defined as a way of providing health services through the use of innovative technologies in the event that the health professional and the patient (or two professionals) are not in the same location<sup>[6]</sup>. The technologies that are most frequently used to provide telemedicine services are videoconferences, internet platforms, structured telephone interviews, devices that record and subsequently transmit data, devices that via bluetooth are connected to medical instruments and transmit data via the internet. In an organization such as a hospital, in order to develop a telemedicine system, a fundamental role is played by the computer systems that have the purpose of allowing the management of information. Currently there are three health information systems: the Hospital Information System (HIS), the Radiological Information System (RIS) and the System for Archiving and Communication of Images (PACS). This type of medicine also uses telemonitoring, which consists in the use of information technology for remote monitoring of patients. Telemedicine offers opportunities in the management of chronic pathologies, but its effectiveness varies according to the pathology treated. It is probably important to properly select patients to be remotely monitored<sup>[7]</sup>. The same goes for telerehabilitation, which is defined as the use of information and communication technologies to provide remote rehabilitation services to people in their homes. The responsibility of the doctor and the telemedicine therapist can be criminal, civil, administrative and ethical; but the most delicate aspects in telemedicine are those concerning privacy, patient information, computer security, consent to the use of images and compliance with ethical secrecy principles.

## **Guidelines on the practice of Telerehabilitation**

In Italy there is no specific legislation on telemedicine and telerehabilitation, but only some guidance guidelines. In this regard, the Register Commissions and the Technical-Scientific Associations AITNE<sup>[8]</sup> and ANUPI TNPEE<sup>[9]</sup> have prepared a single text<sup>[10]</sup> for the TNPEE with the aim of providing an answer to the needs and clarification on the application of the legislation which necessarily involves a remodeling of the practice. clinic. The figure of the TNPEE, corresponding to the ATECO code 86.90.29, "Other independent paramedical activities", was never compulsorily suspended by the Decrees issued in phase 1 and phase 2. However, it was allowed to carry out the activities in presence only in situations where processing cannot be postponed in order to contribute responsibly to containing the pandemic. In phase 3, to carry out the therapies in the presence it is necessary to adopt all the safety measures provided for by the Prime Ministerial Decree of 26 April 2020 and by the subsequent provisions provided for by the standard. Specifically, within the therapeutic setting it is necessary, in cases where it is not possible to maintain a safety distance greater than one meter, the use of the mask for the operator and, where possible, for the patient, together with other devices disposable and non-disposable protective gloves, such as gloves, visor and disposable gown. From here the first critical issues emerge, since, first of all, for the users of the rehabilitation services of the developmental age, the distress linked to the pandemic and the measures that have been decided to contain it can have a negative impact on their health and behavior, but above all, secondly, for users who belong to the neuropsychomotor therapy service, in other words children, the privileged approach remains body contact with the

therapist, or in any case with the other and with the adult. Nonetheless, for the TNPEE, communication and relationships are essential to create a therapeutic alliance, which is mostly based on direct contact with the patient who uses the body and tonic-emotional dialogue as an elective modality. In the current pandemic phase, after the DPCM of 13 and 18 October 2020 on the prevention of contagion and compliance with security measures for Covid-19, the technical-scientific association ANUPI TNPEE, in collaboration with AITNE and the FNO TSRM and PSTRP<sup>[11]</sup>, did not highlight within the same substantial changes to the provisions already in force with reference to rehabilitation activities in developmental age.

**LINEE DI INDIRIZZO  
E RACCOMANDAZIONI  
AI TERAPEISTI DELLA NEURO  
E PSICOMOTRICITÀ  
DELL'ETÀ EVOLUTIVA**

DOCUMENTO CONDIVISO DA  
FEDERAZIONE NAZIONALE DEGLI ORDINI TSRM E PSTRP  
ASSOCIAZIONI TECNICO SCIENTIFICHE



**Fig. 2** - Guidelines and recommendations to tnpee

The objectives of the study are to clarify the importance of using the body in Neuro and Psychomotor therapy of the Developmental Age, to analyze how much during the phases of the pandemic this privileged way of approaching the patient has been neglected - for obvious reasons - and to ascertain how the almost total lack of body contact in the resumption of face-to-face therapies can affect the long-term goals of treatment plans.

## **MATERIALS AND METHODS**

A systematic review of the scientific literature was carried out relating to the use of the body in Neuro and Psychomotor therapy of the Developmental Age and the use of telemedicine and tele-rehabilitation in the light of the pandemic still in progress. In this regard, the search engines Google Scholar, Google Books, PubMed, Science Direct and ResearchGate were used in the searching phase and the Boolean operator AND was used to combine the keywords. The results of the literature search were selected on the basis of free text accessibility filters and publication within the last 5 years. In addition to the scientific search engines mentioned, the main open access journals accessible free of charge on the web dedicated to the profession of the TNPEE and psychology and pedagogy were consulted, as well as the most salient reference texts of the same disciplines. A questionnaire of 24 questions, divided into 4 sections, was then formulated and administered in a time of 3 months to 640<sup>[12]</sup> volunteer subjects to investigate the effect of the new Coronavirus health emergency on the use of the body in Neuro and Psychomotor therapy of the Evolutionary Age and telerehabilitation.

## **RESULTS OF THE SYSTEMATIC REVIEW OF SCIENTIFIC LITERATURE**

There is no doubt that today's society pays particular attention to the body; however, we do not always question the role and functions it plays in daily experience and in rehabilitative practice with the various psychological, cultural and educational effects that this emphasis entails. The body is the medium of human experience, communication and knowledge, it is the means that allows us to act in the world, to get in touch with others and with the surrounding reality, as well as the medium for expressing needs and feelings. This



therefore becomes a field of experience, the only referent of the presence of the subject, whose very existence is identified with it, since it is through it that one experiences those sensations and emotions that constitute the personal heritage of each one. The main ways in which it is perceived are also part of this subjective baggage: proprioception, which gives a sense of the position of the body in the environment; interoception, inherent in the sensation of the organism's homeostatic balance; background feelings, which are the basic perceptions that define the body's internal "temperature". Starting from the body therefore means activating the primary capacities of feeling, interpreting, thinking and modifying the environment, as well as those of knowing how to communicate spontaneously and immediately with the other, prerogatives that belong to the human being and define his presence in the world even when individuals are still in the formation phase (newborn) or when decay has deprived them of important functions (disability, illness, senescence). The language of phenomenologists has described the body complexus in depth, distinguishing a body as a visible and concrete form, Gestalt, a body as it is depicted in iconography and cultural discourses<sup>[13]</sup>, Körper, and a body that we feel and with which we feel, the living body, Leib. This last dimension highlighted the corporeality as well as the mere physical fact, that is, the feeling of the body in its biological, psychic, cultural and social dimension.

The body, a privileged channel for knowledge of the world, represents the gateway to rehabilitation: starting from pleasant and motivating activities, it is possible to activate all the potential that the subject has available. It is therefore a question of promoting an articulated growth path, made possible, on the one hand, by the progressive maturation of neurobiological structures that are able to organize

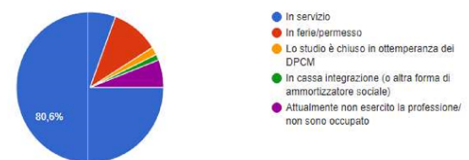
experiences in systems of increasing complexity and, on the other, by the progressive acquisition of motor, practical, linguistic and social emerging skills. In fact, in neuropsychomotor therapy, through play and relationship, those channels that support the various areas of development are activated, supporting the different functions and finding the most functional strategies that allow the child to relate to the outside world and carry out actions that everyday life requires. Your body is the first object that the child has in order not to get bored and to experience functional pleasure and the ability to cause events: the body is the first source of stimulation for the child because it is permanent and always available, unlike all other objects that come and go. It is the therapist's task to listen to what the child expresses through non-verbal bodily communication and respond using his own body, through tone, posture, gesture, facial expression, gaze, recognizing and giving meaning in this way to the bodily experiences of the child. This is how, progressively, the body sensation becomes an emotion recognized and mentally represented. In this regard, the TNPEE acts by listening to the child through tonic empathy, which requires a very deep adjustment on the tonic level. Tone is perceived through body contact, presupposing a reciprocal body-to-body adjustment. Gradually, the tone is perceived even at a distance, through the voice, the gaze, the postures, allowing a "tele-adjustment", in which the use of the body is still necessary. The listening attitude is a necessary condition for the child to be able to speak with his own body. Listening and tonic adjustment through direct contact with the child allow the therapist to give birth, mobilize and develop the child's sensory-motor pleasure towards the most diverse creative forms. The TNPEE to interact with the child uses interactive systems, including the scenario - which encourages non-verbal

communication based above all on posture and proxemics<sup>[14]</sup> -, moves<sup>[15]</sup>, which are shortterm actions with a specific purpose to modify interactive behavior between the child and the psychomotor environment, and guided actions, which have the purpose of specifically stimulating certain psychomotor functional areas. The purpose of the therapy is to solicit concrete action and, while not excluding verbal language in communicating with the subject, it prefers the immediacy of contact that is not established through words, but through a non-invasive body language, which respects the intimacy of others. The therapeutic relationship that is created has its specificity, even if it has affinities with therapeutic relationships typical of other professions, such as doctor, psychotherapist and nurse. However, it is different from speech therapy, which addresses speech disorders, and physiotherapy, which develops or restores a specific motor function. In the latter profession, however, as in neuropsychomotor therapy, the therapist's body and that of his patient are both involved; however, it is not the same bodily implication. In addition to being attentive to the child's bodily reactions, the TNPEE also observes its own: it adjusts them, adapts them to the situations that arise during the session. He therefore maintains a particular focus on himself at the moment of bodily interaction with the subject, which allows him, through tonic adjustment, to tune in with the psychomotor temperament of the person being treated.

## **RESULTS OF THE QUESTIONNAIRE**

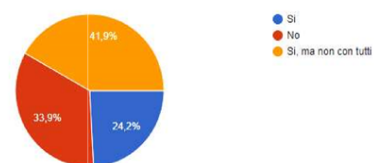
The results of the questionnaire were analyzed through the Google Forms application. The first section is introductory to the questionnaire; in the second, the socio-demographic information of the subjects enrolled was collected, which results in a clear prevalence of women (89.8%). The age of the participants varies

from 18-25 years (23.4%) to 25-50 years and over (76.6%); 84.8% of respondents have a three-year and/or master's degree, while the remaining part (15.2%) has obtained post-graduate certifications, such as masters and/or research doctorates. The geographical distribution of individuals is mostly represented in the regions of Lazio (20.8%), Campania (17.8%) and Lombardy (14.5%) and in the cities<sup>[16]</sup> of Rome (13.3%), Naples (13.1 %) and Milan (10.6%). In the third section, work information and information regarding the possible use of telerehabilitation and the use of PPE were collected. At present, 80.6% of workers are on duty, while the remainder are on vacation/leave or other (Figure 3).



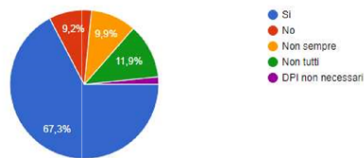
**Fig. 3** - Current working position of the enrolled persons

66.1% of the interviewees were able to initiate tele-rehabilitation processes, of which 41.9% not with everyone. Conversely, 33.9% of individuals did not carry out telematic interventions (figure 4).



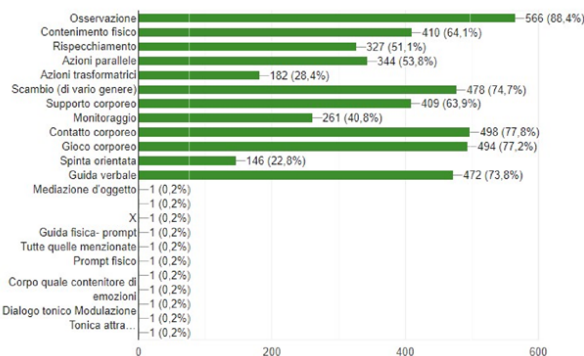
**Fig. 4** - remote rehabilitation

Regarding the use and supply of PPE (Figure 5), 67.3% of the subjects of the analysis claim to always use them, 1.7% assert that PPE is not necessary; the remaining 31% stated that they do not receive it at work (9.2%), or that they do not always receive it (9.9%) or that they only get a part of it (11.9%).



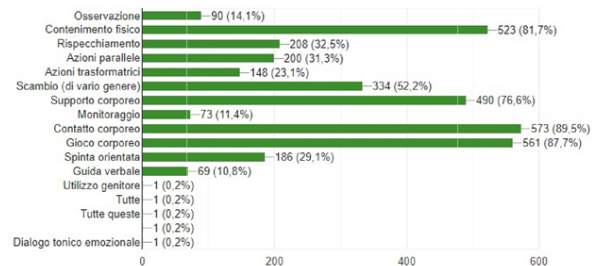
**Fig. 5 - ppe use and supply**

Regarding the preventive measure of social distancing, 88.1% of therapists state that it is having a great impact in neuro and psychomotor therapy, as 58.3% argue that the use of the body and body contact in therapy of neuro and psychomotricity is predominant with respect to other communicative and/or relational modalities. Specifically, in the last section the role of the body in Neuro and Psychomotor therapy of the developmental age was investigated through the main moves used by therapists (figure 6), which turn out to be observation (88.4%), body contact (77.8%) and body play (77.2%).



**Fig. 6 - typical "moves" of neuro and psychomotor therapy**

In particular, the use of the body (Figure 7) is believed to be fundamental in body contact (89.5%), in body play (87.7%) and in physical containment (81.7%), another therapeutic move.



**Fig. 7 - therapeutic moves in which the use of the body is fundamental**

## DISCUSSION

As professionals who work in developmental age, we are now facing the population born around the 2000s, the generation that is defined as "digital natives". It is a generation that is born and grows immersed in the context of the technological revolution and which therefore masters the tools that distinguish it with increasing ease. While it is true that some technological tools may have therapeutic utility, it is equally true that they can increase the health risks that excessively early and prolonged exposure to electronic devices entails for the child. To the disadvantage of digital we find a series of information deriving from the medical/scientific field: electromagnetic fields have been classified by the AIRC as possible carcinogens and the risks relating to the development of visual disturbances connected to the incorrect use of monitors are now known, especially in pediatric age. Furthermore, several studies are concerned with demonstrating that problems such as obesity, attention disorders, delays in language, relational and social skills can be the result of a deprivation of diversified sensory experiences. This deprivation is often connected to the disproportionate use of electronic devices to the detriment of concrete gaming experiences. This seems to have serious repercussions even in the development of brain connections, which has nothing to do with digitization. One of the main concerns related to media and neo-media use/abuse in developmental age and

which exposes to a series of cognitive, affective, relational, psychological and neuropsychic development problems is represented by information overload, that makes the child unable to retain, manage, process and interpret the amount of information and data that reach him. Therefore, the role played by adults within techno-mediated transactions emerges. The presence of an adult favors a setting of the child's cognitive capacity, helping him to discriminate between the amount and diversity of information that he can assimilate from technological devices. In addition to information overload, another dimension of the wide and early contact that children have with technological tools is that of sensory stimulation. Spitzer, speaking of "digital dementia", highlights how the sliding of the fingers on a smooth surface, without contours and structure, is the simplest gesture that can be made from a motor point of view and boring from a sensorial point of view. He also claims that a child needs more complete experiences: the optical input must correspond to an acoustic and a tactile one so that the brain does not get confused. We ask ourselves, therefore, whether the new means of communication mean even less opportunity for children to learn. From a strictly cognitive point of view, media use in early childhood seems to be related to poorer executive functioning. It is no coincidence that guidelines from the American Academy of Pediatrics<sup>[17]</sup> are produced for parents on the use of digital devices, aimed at not abusing technology with their children, as it makes them highly passive and strongly inhibits interactions. The learning of social skills develops through relationships and face-to-face interactions; only the latter are characterized by all those para-verbal aspects underlying the development of empathic abilities. The psychomotor vision favors the centrality of the subjects in the cognitive process, seen as a life process.

Experts in various capacities recall the importance of perceptual experience for the growth and learning of the child. Neuropsychomotor activity therefore facilitates positive learning because it stimulates perception in an interactive knowledge with the external environment, a coconstruction of meaning through an interaction between the subject and the environment.

## **CONCLUSIONS**

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Ultimately, it is not possible to stigmatize the use of technology in the age of development, as it strongly characterizes modern society and the context of life in which children are immersed. Furthermore, there are learning areas in which electronic devices can represent a valid support. Tablets and computers cannot in any way replace the specificity of human relationships, relationships with peers, games of movement and manual skill. Similarly, the use of new technologies in rehabilitation must be seen as an integral part of taking charge and as a further possibility to establish a good therapeutic alliance with the child's family and, therefore, create a therapeutic continuum. Certainly, telerehabilitation is an efficient tool for therapy and was indispensable in the initial stages of the pandemic, but it certainly represents only an integration to what is the neuro and psychomotor rehabilitation practice of the developmental age, whose fundamental element is the body, body contact and body interaction. In conclusion, the use of the body in neuropsychomotor therapy is fundamental, if not essential, as it predominates over other communicative and/or relational modalities. TNPEEs, in particular, mostly use therapeutic strategies in which the body is the undisputed protagonist; these include exchange, contact and body play, as well as observation, physical containment and mirroring. It is deduced that this privileged



approach has certainly been neglected for reasons related to compliance with the rules to limit the contagion of Covid-19, including the preventive measure of social distancing which negatively influenced the continuation of neuropsychomotor therapy with an impact of 90 % about. Finally, from the analysis on the neglect of the body in therapy, about 70% of therapists ensure that the total absence of the body, or partial use of the same in compliance with the anti-Covid 19 rules, significantly affects therapeutic practice as well as on the establishment of attunement with the patient, on the maintenance of a stable relationship over time and on the achievement of pre-established treatment objectives.

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## NOTES

- [1] A fomite is any inanimate object which, if contaminated or exposed to infectious agents such as a virus, can transfer a disease to another person.
- [2] Currently, extended until January 31, 2021.
- [3] Decree-Law converted with amendments by Law 5 March 2020, n. 13 (in GU 09/03/2020, n. 61).
- [4] Allowed, at this stage, only for business reasons and situations of need.
- [5] Subsequently abbreviated with the abbreviation TNPEE.
- [6] [www.salute.gov.it](http://www.salute.gov.it)

- [7] For example, those most at risk and those most “compliant”.
- [8] Italian Association of Neuro and Psychomotor Therapists of the Evolutionary Age.
- [9] National Association of Italian Neuro and Psychomotor Therapists of the Evolutionary Age, listed among the scientific societies and technical/scientific associations of the Health Professions pursuant to the Ministerial Decree 02/08/2017.
- [10] [https://www.anupitnpee.it/attachments/article/1384/Documento%20TNPEE%20congiunto%20COVID%201.5.2020%20\(1\).pdf](https://www.anupitnpee.it/attachments/article/1384/Documento%20TNPEE%20congiunto%20COVID%201.5.2020%20(1).pdf)
- [11] National Federation of the Orders of Health Technicians of Medical Radiology, of the Technical Health Professions, of Rehabilitation and of Prevention.
- [12] About 12% of the Italian TNPEEs out of the 5308 members of the Order

of TSRM and PSTRP and on the 98 associated with the Special List upon exhaustion of the TNPEE, including a non-quantifiable share of Italian psychomotorists.

- [13] Or how we represent it mentally.
- [14] Non-verbal communication through space: distance, location of the body.
- [15] Non-verbal actions: observation, physical containment, refueling, exact / inexact or emphatic mirroring, parallel actions, transforming actions, exchange, body support, monitoring, body contact, tonic dialogue, body play, imbalance, exhibition, oriented push, capture of the attention (visual, auditory, olfactory and tactile), sound dialogue, vocality, verbal guidance.
- [16] City of registration in the register / professional order or special list.
- [17] 2016, available at the link: <https://pediatrics.aappublications.org/content/pediatrics/138/5/e20162591.full.pdf>