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organizzano il convegno

IL DOMANI ARRIVA VELOCE: L'EDUCAZIONE DELLE PERSONE CON AUTISMO DAL NIDO ALLA SCUOLA SUPERIORE

con la partecipazione della

Associazione Nazionale Genitori Soggetti Autistici di Bologna

BOLOGNA, 17 maggio 2014, TEATRO DUSE, Via Cartoleria, 42



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Ministero dell'Istruzione,
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Bologna 17 maggio 2014

***La Motricità nei Disturbi dello Spettro Autistico
Aspetti neurologici e possibili interventi***

Paola Visconti



Ambulatorio Disturbi dello Spettro Autistico

U.O.C. NPI (Dott. Gobbi)

IRCCS

Istituto delle Scienze Neurologiche

Bologna

MOTOR DEFICITS IN ASD CHILDREN



Leo Kanner (1943)

“...almost all mothers recalled their attonishment at the children failure to assume at any time an anticipatory posture preparatory to being picked up”

- Anche se negli ultimi anni c'è stata una maggiore attenzione, ancora poco studiato è **il rapporto movimento ed autismo sia dal punto di vista delle anomalie dello sviluppo motorio e posturale che in ambito di intervento terapeutico.**
- L'importanza dell'attività motoria nell'ambito dei DSA è confermata dalla presenza di deficit sensoriali e motori che suggeriscono un più generale coinvolgimento dei circuiti neuronali, probabilmente relativo all'alterazione della citoarchitettura dell'encefalo, necessario per una opportuna integrazione delle informazioni.

- Il sistema motorio è il meglio descritto e può essere **più semplice da indagare rispetto a sottostanti complesse funzioni cognitive e sociali.**

..... indagare il sistema motorio potrebbe dare l'opportunità di capire parte delle anomalie nella connettività neuronale descritte nei DSA (Minschew 2004)

Moving On: Autism and Movement Disturbance

Martha R. Leary and David A. Hill

Table 1
Studies of Individuals With Autism in Which Movement Disturbance Phenomena Were Discussed

Study	Movement disturbance
Ayles, 1979; Biklen, 1990; DeMyer et al., 1972; Jones & Prior, 1985	Apraxia/dyspraxia (e.g., difficulty with motor planning and sequencing of movements)
Bram, Meier, & Sutherland, 1977; Gillberg, 1991; Wing & Attwood, 1987	Lack of gross motor control or clumsiness
Bond, 1986; Ornitz, 1974; Vilensky, Damasio, & Maurer, 1981	Abnormalities of gait and posture
Damasio & Maurer, 1978; Maurer & Damasio, 1982	Akinesia/dyskinesia (e.g., difficulty initiating or switching movements, freezing or stopping movement); bradykinesia (e.g., slowness of movement)
Comings & Comings, 1991; Realmuto & Main, 1982; Sverd, 1991; Wing & Attwood, 1987	Tourette syndrome (e.g., stereotyped movements; vocal, verbal, and physical tics; obsessive-compulsive traits)
Realmuto & August, 1991; Wing & Attwood, 1987	Catatonic-like phenomena (e.g., mutism, echolalia, repetitive movements, automatic obedience, odd hand postures, interruption and freezing of movements, stupor, and frenzy or excitement)

Table 1

Type	Key features
Stereotypies	Part of core features of ASD Associated with lower IQ and may be marker for overall ASD severity
Motor delays	Could represent an early indicator for the development of ASD Early oral motor skills and motor imitation may predict language acquisition
Gait	Wide range of abnormalities including toe-walking, ataxia, stiffness, foot movement, and postural abnormalities
Incoordination	Seen in upper body movements, gait, and postural control
Dyspraxia	Found to significantly correlate with social, communication, and behavioral deficits

ASD, autism spectrum disorder; IQ, intellectual quotient.

Common neurological co-morbidities in autism spectrum disorders.

Maski, Kiran; Jeste, Shafali; Spence, Sarah

Current Opinion in Pediatrics. 23(6):609-615, December 2011.

DOI: 10.1097/MOP.0b013e32834c9282

Table 1 Types of motor deficits in autism spectrum disorders

Movement Differences for people with autism

by Martha R. Leary, David A. Hill & Anne M. Donnellan (2007)

Movement and Sensory Differences

Detailed personal descriptions of movement and sensory differences found in other disabilities have given us some clues as to what it may be like to deal with various symptoms such as compelling impulses, a loss of conscious control, lack of initiation, akinetic moments and unusual ways of being in the world. Leary and Hill (1996) analyzed the literature on symptoms associated with established movement disorders and those associated with autism. The greatest difference among these disabilities was the interpretation of the symptoms. In Tourette syndrome, Parkinsonism and Catatonia, there was a neurological interpretation of symptoms. A social rather than a neurological interpretation of the same symptoms was applied if the person had a label of autism. That which is called a 'tic' in a person with Tourette syndrome is most often considered a 'behavior' (and often a conscious choice) in a person with autism. For neurologically interpreted symptoms, individuals tend to be appropriately supported. In autism, symptoms are viewed as behaviors to be reduced or eliminated often with a negative intervention.

Nei bambini autistici è facile pensare ad una tendenza all'allontanamento da contesti motori e relazionali tipici dell'età evolutiva, ipotesi che sembra essere confermata da alcuni recenti studi (Memari 2012).

Questo esito potrebbe essere lo starter di un **circolo vizioso costruito sulle difficoltà sociali e motorie, che possono portare ad evitare i contesti sociali e motori, con un conseguente aggravamento delle difficoltà stesse e** possibile sviluppo di una condizione **sedentaria associata**

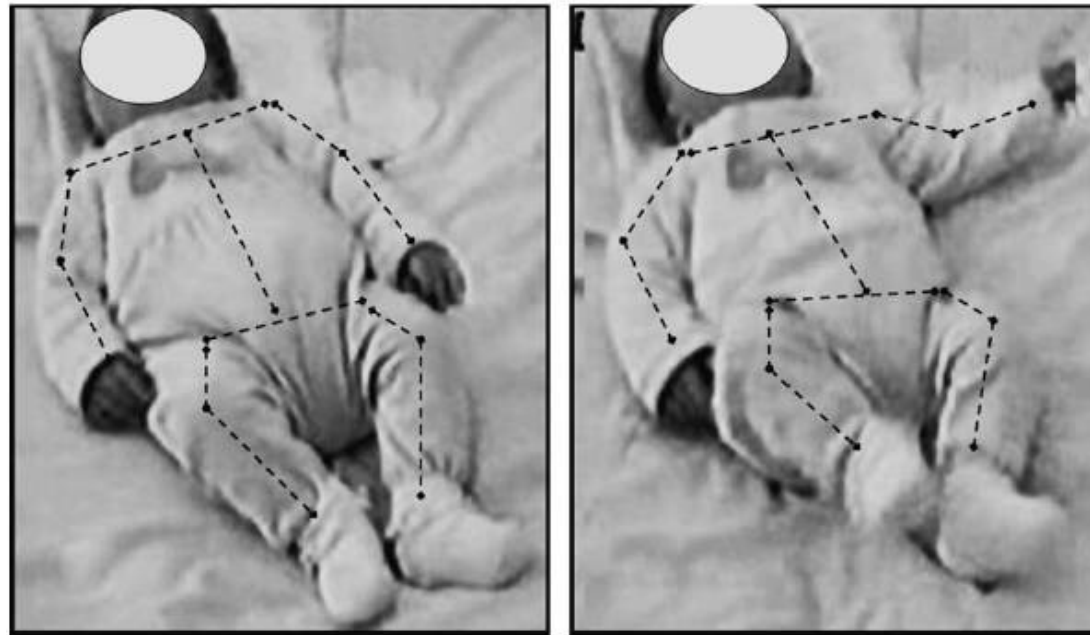
Original article

An exploration of symmetry in early autism spectrum disorders: Analysis of lying

Gianluca Esposito^{a,*}, Paola Venuti^a, Sandra Maestro^b, Filippo Muratori^b

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Le difficoltà possono emergere sia a carico della programmazione del movimento (Vernazza-Martin 2005) sia della **simmetria statica e dinamica, oltre alla riduzione della stabilità posturale** (Esposito 2011, 2012, Teitelbaum 1998, 2004).

Original article

Analysis of unsupported gait in toddlers with autism

Gianluca Esposito^{a,b,*}, Paola Venuti^a, Fabio Apicella^c, Filippo Muratori^c

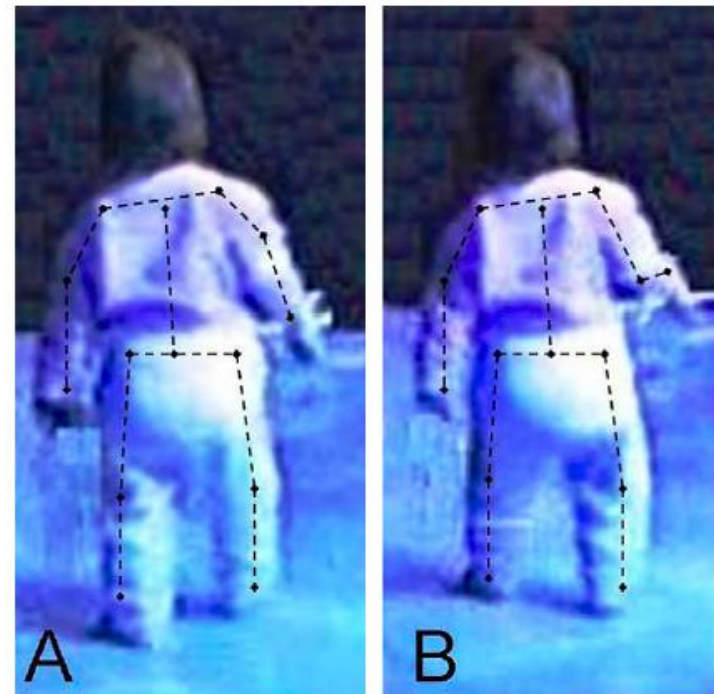
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“Significant differences in gait patterns among the group of toddlers with AD as opposed to the control groups”



Esposito G et al. hanno riportato come in bambini autistici che iniziano a camminare (12,9-14,2 mesi) possono esistere **differenze nei patterns del cammino con asimmetrie rispetto ai controlli**. Per questo motivo gli autori ipotizzano come la persistenza di asimmetrie nei patterns di movimento nel secondo anno di vita possa essere un parametro utilizzabile come **indicatore precoce di un potenziale autismo** (Esposito 2010).

Chester V.L. et al. (2012) hanno riportato come l'asimmetria nel cammino documentata in alcuni bambini autistici nel corso della prima infanzia da alcuni autori, (Esposito 2009, Teitelbaum 2004) sembra non essere più presente in soggetti autistici di età compresa fra i 5 ed i 9 anni

Motor control and children with autism: deficit of anticipatory function?

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Abstract

This study aims at investigating how do anticipatory postural adjustments develop in children with autism, during a bimanual load-lifting task that required maintaining the stabilisation of the forearm despite imposed or voluntary unloading. Elbow angle and electromyographic were recorded on the child forearm supporting the load. The forearm stabilisation was as good in children with autism as in the control group. However, in children with autism, the latencies for both kinematics and muscular events indicated an increase of the duration of unloading. These results indicate the use of a feedback rather than a feed-forward mode of control. Impairments in both the building of internal representations and the mastering of timing parameters, could explain the deficient postural anticipation reported in children with autism.

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Keywords: Autism; Anticipation; Motor development; Electromyographic; Kinematics

This “mirror neuron” system (MNS) has been proposed to underlie a number of critical social-interactive and social-communicative skills, including:

- imitation,
- language development,
- empathy, and
- understanding the social perspectives and intentions of others (Iacoboni and Dapretto, [2006](#)).

... But now it is clear that the MNS is not entirely “broken” in this population.

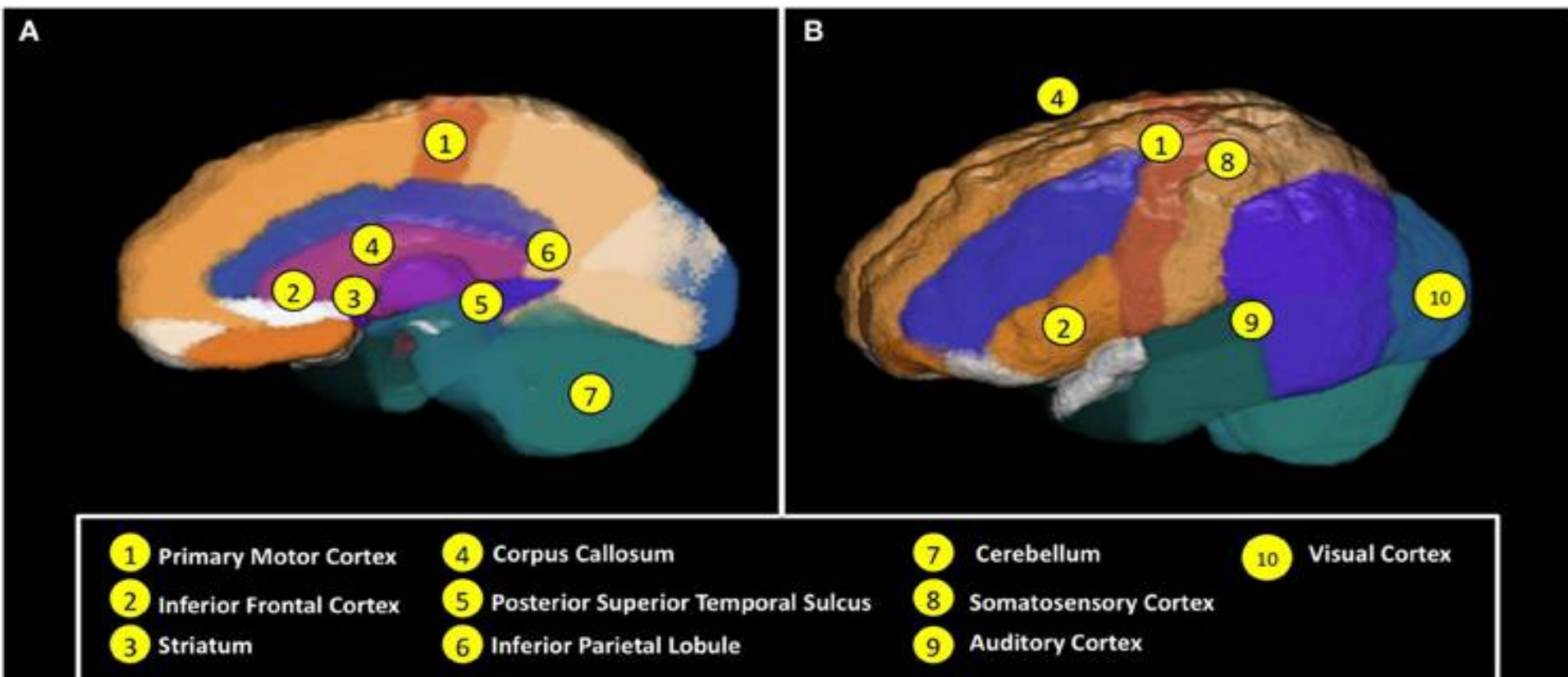
Mirrors Neurons ... o meglio

Sistema di **Risonanza Motoria**

Our motor system “resonates” the actions of others that we view, hear, or view and hear (di Pellegrino et al., 1992; Rizzolatti et al., 1996; Iacoboni et al., 1999; Kohler et al., 2002; Gazzola et al., 2006).

That is, our motor planning and related action production systems in pre-motor and other regions of the cortex appear to “**mirror**” the actions of observed others onto our **own action/motor planning system** (e.g., Inferior Frontal Gyrus, Inferior Parietal Lobule, Superior Temporal Sulcus;)..

presumably allowing us to **better represent and understand the nature and details of the actions and activities of others** (Rizzolatti and Craighero, 2004).



Sistema Mirror- Risonanza motoria

Corteccia frontale inf (2) +Solco temp.sup.(5) +Lobulo pariet.inf (6)

McCleery et al . Motor Implication for early intervention ,
Frontiers in Integrative Neuroscience , April 2013

» In summary, evidence suggests that individuals with autism exhibit reduced or **absent motor resonance activity** during the observation of the actions of unfamiliar others.

Come si collega pattern motorio atipico –
alterato-deficitario con..



l'Intervento ?

Front Integr Neurosci. 2013; 7: 30.
Published online Apr 24, 2013

**Motor development and motor resonance
difficulties in autism: relevance to early
intervention for language and communication
skills**

Joseph P. McCleery,^{*} [Natasha A. Elliott](#),
[Dimitrios S. Sampanis](#), and Chrysi A. Stefanidou

Primi segni di atipie motorie (1)

- **Vocal-motor and facial-motor coordination** emerges during face-to-face interactions in the first half of the first year of life (Iverson and Fagan, 2004)
- Infants begin to engage in **coordinated vocal and facial motor activity routines** (such as reciprocal vocalizations, imitation of mouth opening, positive/negative facial expressions, and gaze) on a second-by-second timing scale, with both familiar and unfamiliar communicative partners.
- This **motor synchrony** reflects interpersonal coordination of listening to and producing vocal-motor activity, which can be considered developmental precursors to the timing **pragmatics of interpersonal interaction during conversation** (Colonnaesi et al., 2012).

Primi segni di atipie motorie (2)

Hypothesis that risk for autism is associated with **impaired vocal-motor coordination synchrony at 4-months of age**, and that this has relevance to the later development of linguistic and pre-linguistic behaviors.

Another major stage of links between motor activity and language development occurs during the **second half of the first year of life** (Bates et al., 1999; Bates and Dick, 2002).

Studies have shown that sharp increases in coordinated and repetitive arm movement and hand banging co-occur with the onset of reduplicative babble (i.e., canonical babble; e.g., “baba”) between **6- and 11-months of age** in typically developing infants, likely reflecting **entrainment of the vocal and manual motor systems** (Locke et al., 1995; Iverson et al., 2007; Petitto and Marentette, 1991; Petitto et al., 2004).

POSSIBILI INTERVENTI ESISTENTI CORRELATI ALL'AMBITO MOTORIO AD INDIRIZZO SU COMPETENZE LINGUISTICHE E SOCIO- COMUNICATIVE

Interventi CAA

- Linguaggio dei segni
- PECS

Interventi comportamentali Motor-based

- PROMPT (ristrutturazione fonetica muscolare orale con Prompt)
- Auditory motor mapping treatment

Electromagnetic brain stimulation intervent.

- TdCS/TMS (Stimolazione magnetica transcranica)

Interventi con attività motorie sincronizzate

- ESDM (Early Start Denver Model)
- RIT (Reciprocal Imitation training)

McCleery et al , 2013

We now know from extensive research that **SLT** is not a very effective intervention for facilitating speech and language development in this population.

Potential reasons for this include that children with autism exhibit specific difficulties in **iconicity, imitation of the actions of others, and/or fine motor skills**, which make it difficult for them to become effective signers.

On the other hand, these children appear to learn a **picture-based social-communication program** relatively rapidly, and extensive evidence suggests that this type of communication training does facilitate the development of basic speech skills in many of these children

The results of several recent studies examining predictors of speech/language outcomes following early behavioral intervention suggest that **a child producing even a few words prior to the start of intervention can play a key role in whether or not that child makes speech and language gains during the intervention**

(Gordon et al., 2011; Nahmias et al., 2012)

Teach **speech/language and social communication skills** in the specific context of socially engaging **synchronous motor activities as a potential motor-related pathway** to increasing social-communication and language skills in this population (McCleery et al. April 2013)

Esperienze ultimi decenni

- Necessità di una fortissima integrazione e visione *ecologica* (ampia) degli interventi di abilitazione e riabilitazione.
- *“Nulla è più assurdo, per un soggetto autistico, di interventi tecnici, psicoeducativi o altro condotti al di fuori di una coerenza e di una integrazione tra intervento stesso, il contesto di vita e le prospettive esistenziali”* (Barale, 2003).