

La medicina osteopatica nei disturbi dello spettro autistico BARI 3-4-5 OTTOBRE 2025



GLOBALITA'

**L'efficienza di una singola funzione,
seppur isolata, dipende dalla salute
dell'intero sistema.**

Eva Benso

*Psicologa, Trainer Attentivo 3° livello formatore del Metodo
Benso e Applicatore SMAART del Metodo Feuerstein*

FUNZIONI COGNITIVE

Le 8 funzioni cognitive a cui ci si riferisce comunemente (sebbene il concetto possa variare leggermente) sono generalmente:

1. Attenzione
2. Memoria
3. Linguaggio
4. Gnosia (percezione)
5. Praxia (azione e movimento)
6. Funzioni Esecutive
7. Cognizione Sociale
8. Percezione Spazio-Temporale.

Queste abilità sono essenziali per pensare, apprendere, interagire con l'ambiente e svolgere le attività quotidiane.

FUNZIONI COGNITIVE

1. Attenzione:

La capacità di concentrarsi su informazioni rilevanti ed ignorare quelle non importanti.

2. Memoria:

La capacità di immagazzinare, conservare e recuperare informazioni ed esperienze.

3. Linguaggio:

La capacità di comprendere e usare il linguaggio per comunicare ed esprimere pensieri.

4. Gnosi (o Percezione):

La capacità di riconoscere e interpretare le informazioni sensoriali, come oggetti, volti e suoni.

FUNZIONI COGNITIVE

5.Praxia:

Le abilità di pianificare ed eseguire movimenti complessi e coordinati.

6.Funzioni Esecutive:

Un insieme di abilità cognitive che includono la pianificazione, la risoluzione di problemi, il ragionamento, il processo decisionale e la flessibilità mentale.

7.Cognizione Sociale:

La capacità di comprendere i pensieri, le intenzioni e le emozioni degli altri, e di interagire in contesti sociali.

8.Percezione Spazio-Temporale:

La capacità di orientarsi e percepire la posizione degli oggetti e degli eventi nello spazio e nel tempo.

SVILUPPO SENSORIALE-MOTORIO

- MECCANISMI TOP-DOWN: vie discendenti
- **MECCANISMI BOTTOM-UP**: stimoli periferici come pressione meccanica, sostanze chimiche, luce, suoni, freddo-caldo, stimoli elettrici.
- MAGGIORE SENSIBILITA' < TOLLERANZA AL CARICO SENSORIALE DEL SISTEMA NEUROMUSCOLOSCELETRICO

SENSIBILIZZAZIONE CENTRALE

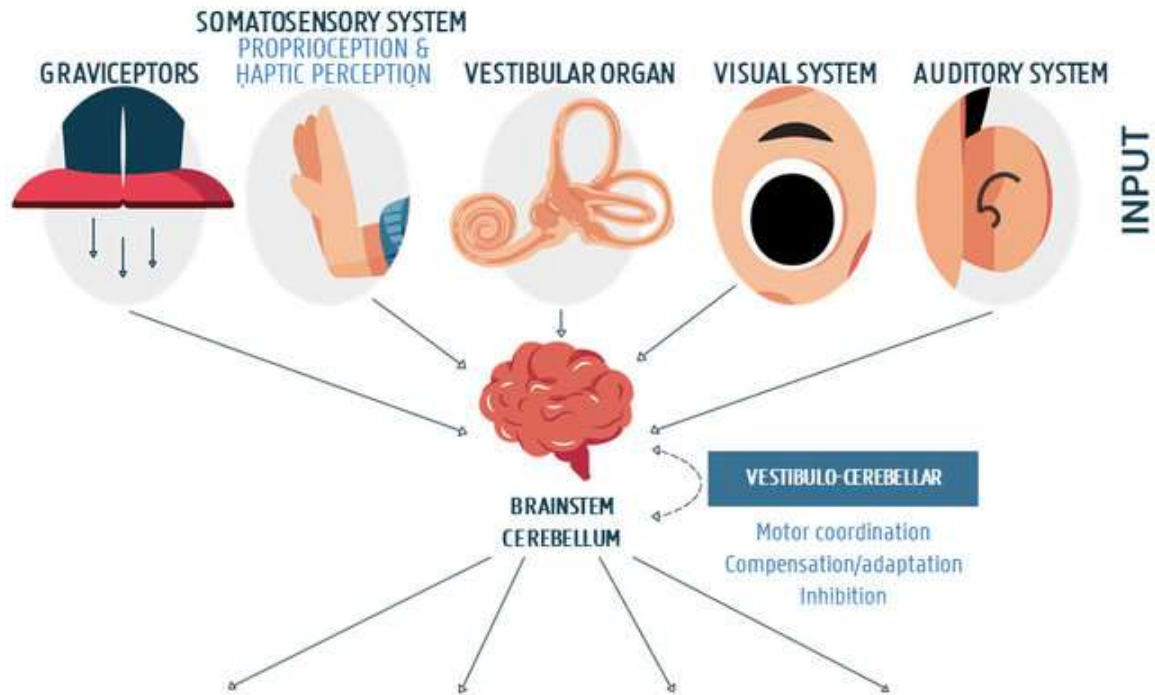
AUMENTO DELLA REATTIVITA' DEI NEURONI CENTRALI ALL'IMPULSO DEI RECETTORI UNIMODALI E POLIMODALI (MEYER 1995)

COMPRENDE L'ELABORAZIONE ALTERATA NEL CERVELLO (STAUD 2007),

IL MALFUNZIONAMENTO DEI MECCANISMI ANTI-NOCICETTIVI DISCENDENTI (MEEUS 2008),

L'AUMENTO DELL'ATTIVITA' DELLE VIE DI FACILITAZIONE DEL DOLORE

THE VESTIBULAR SYSTEM



INPUT

| VESTIBULO-OCULAR | VESTIBULO-SPINAL | VESTIBULO-SYPATHIC | VESTIBULO-(SUB)CORTICAL |
|--|--|---|---|
| Gaze stabilization during head movements | VESTIBULO-CERICAL Postural stability Head control | Heart rhythm Blood pressure Autonomic functions | Spatial orientation Perception of own movements Attention, memory, concentration Cognition and emotion Circadian rhythm |



Case Report
Autism Spectrum Disorder and Amplified Pain

- Cross-species affective neuroscience studies confirm that primary-process emotional feelings are organized within primitive subcortical regions of the brain that are anatomically, neurochemically, and functionally homologous in all Case Reports in Psychiatry 3 mammals that have been studied [10]. It may not be surprising, therefore, that in a neurodevelopmental disorder such as autism, in which problems with “shared circuits” may be important [11], these negative emotions might be experienced as unusual types of pain of more or less intensity

RESEARCH ARTICLE

Why do we hunger for touch? The impact of daily gentle touch stimulation on maternal-infant physiological and behavioral regulation and resilience

- **Abstract**

- We report the impact of a Gentle Touch Stimulation (GTS) program. Forty-three
- mothers provided daily 10-min GTS with C-tactile (CT) afferent optimal stroking
- touch, for 4 weeks to their 3–12 weeks old infants. CT-afferents are cutaneous
- unmyelinated, low-threshold mechanosensitive nerves hypothesized to underly
- the regulatory impact of affective touch. We compared physiological and behavioral
- responses during a no-touch-baseline (BL), static-touch-baseline (BL-T),
- intervention/control (GTS/CTRL), Still Face (SF) and Reunion (RU) condition
- for GTS-infants versus a control-group (CTRL) at the start (T1) and end of (T2)
- of the program. We collected mother-infant ECG, respiration, cortisol, videorecordings,
- and diary-reports. At T1, physiological arousal significantly increased
- during SF in both groups, that is, decreased respiratory sinus arrhythmia (RSA)
- and R-R interval (RRI). At T2, GTS-infants showed significantly increased RSA,
- RRI, decreased respiration during GTS, buffering SF-arousal and allowing complete
- recovery during RU; CTRL-infants showed higher SF-arousal and small
- recovery, under initial BL-levels. Maternal cardio-respiratory showed a metabolic
- investment during RU. Cortisol and behavioral analyses showed higher arousal
- in CTRL-infants than GTS-infants at T2. We suggest that the combination of phasic
- short-term and tonic long-term responses to CT-optimal stroking touch, delivered
- in a structured daily manner, contribute to the building of infant stress regulation
- and resilience.

Abnormal Pressure Pain, Touch Sensitivity, Proprioception, and Manual Dexterity in Children with Autism Spectrum Disorders

Hindawi Publishing Corporation


Neural Plasticity

Volume 2016, Article ID 1723401, 9 pages

<http://dx.doi.org/10.1155/2016/1723401>

- Children with autism spectrum disorders (ASD) often display an abnormal reactivity to tactile stimuli, altered pain perception, and
- lower motor skills than healthy children. Nevertheless, these motor and sensory deficits have been mostly assessed by using clinical
- observation and self-report questionnaires. The present study aims to explore somatosensory and motor function in children with
- ASD by using standardized and objective testing procedures. *Methods.* Tactile and pressure pain thresholds in hands and lips,
- stereognosis, proprioception, and fine motor performance of the upper limbs were assessed in high-functioning children with ASD
- ($n = 27$) and compared with typically developing peers ($n = 30$). **Results.** Children with ASD showed increased pain sensitivity,
- increased touch sensitivity in C-tactile afferents innervated areas, and diminished fine motor performance and proprioception
- compared to healthy children. No group differences were observed for stereognosis. *Conclusion.* Increased pain sensitivity and
- increased touch sensitivity in areas classically related to affective touch (C-tactile afferents innervated areas) may explain typical
- avoiding behaviors associated with hypersensitivity. Both sensory and motor impairments should be assessed and treated in children
- with ASD.

Neurophysiological mechanisms of pain in autism



Neurophysiological mechanisms of pain in autism

Dubois A., Stoufferens M., Bonnalbesse A., L'hevedeur G., Quinké S., Waller M., Marchand S., Bodin C.

INTRODUCTION

People with autism spectrum disorders (ASD) have often been considered as insensitive to pain.
Several studies and clinical reports have described a lack or altered reaction to pain, but neurophysiological mechanisms of pain are never been tested in this population.
Pain is a dynamic phenomenon resulting from the activity of both excitatory and inhibitory endogenous modulation systems:

- > Excitatory mechanisms can be tested with a temporal summation paradigm
- > Diffuse nociceptive inhibitory controls (DNIC) constitute an endogenous modulation mechanism triggered by painful stimuli.

OBJECTIVES


1) To test 2 modulation systems in ASD people (excitatory and inhibitory mechanisms).
2) To compare to healthy volunteers (matched on chronological age and sex).

PARTICIPANTS

- 15 adults ASD without mental retardation (31.47 ± 8.52, 9 M, 6 F, ASD group)
- 15 healthy volunteers (31.55 y, 8.39-9M) (control group)

EXPERIMENTAL PAIN PROTOCOL

(Duvignaud-Lafont et al., 2006)



TEMPORAL SUMMATION = Increase of pain intensity (over 60 sec.)

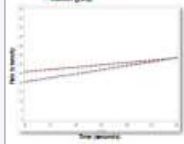
DNIC activation

DNIC activation assessment = Decrease of pain intensity (between P2 et P3)

RESULTS

Temporal summation

Mean pain perception during P1
ASD group (n = 15) - control group



| Group | Mean | SD | CI 95% |
|---------|------|------|--------|
| ASD | 0.2 | 0.41 | 0.2 |
| Control | 0.2 | 0.41 | 0.2 |

Diffuse Nociceptive Inhibitory Controls (DNIC) activation assessment

Pain perception (VAS) mean score and heart rate (HR) mean score) between P1 and P2

| | ASD group (n=15) | | Control group (n=15) | | p-value |
|----------|------------------|-------|----------------------|-------|---------|
| | P1 | P2 | P1 | P2 | |
| VAS | 28.8 | 27.8 | 28.8 | 27.8 | 0.92 |
| HR | 73.8 | 73.8 | 73.8 | 73.8 | 0.92 |
| Slope | 0.11 | 0.01 | 0.22 | 0.13 | 0.001 |
| HR slope | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |

↑ Pain intensity between P1 and P2 (control group)

DISCUSSION

> Excitatory and inhibitory mechanisms in ASD adults not differ significantly from those of healthy adults.
 > Some significant differences should concern ASD clinical sub-groups (more sensitive ASD adults) with an excitatory modulation less important than in healthy adults.
 Lack of reaction to pain in ASD should be related to dysfunction in central pain modulation (emotional, cognitive components of pain) and/or pain expression particularly.
Conclusion
 Pain modulation mechanisms were functioning in ASD adults of this study. These results should indicate that pain sensibility of ASD people not differ significantly from healthy people.

Abdominal Pain in Children and Adolescents with Autism Spectrum Disorder: a Systematic Review

- this pain persisted in 86.4% of the participants
- Associations Between Abdominal Pain/GI Symptoms and Behavioral and Emotional Concerns
- Treatment Options Based on Gut Bacteria, Diet, and Probiotics

2010

Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2010

1:68



1:68



Surveillance Summaries

Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2010

Autism and Developmental Disabilities Monitoring Network Surveillance Year 2010 Principal Investigators

Abstract

Problem/Condition: Autism spectrum disorder (ASD).

Period Covered: 2010.

Description of System: The Autism and Developmental Disabilities Monitoring (ADDM) Network is an active surveillance system in the United States that provides estimates of the prevalence of ASD and other characteristics among children aged 8 years whose parents or guardians live in 11 ADDM sites in the United States. ADDM surveillance is conducted in two phases. The first phase consists of screening and abstracting comprehensive evaluations performed by professional providers in the community. Multiple data sources for these evaluations include general pediatric health clinics and specialized programs for children with developmental disabilities. In addition, some ADDM Network sites also review and abstract records of children receiving special education services in public schools. The second phase involves review of all abstracted evaluations by trained clinicians to determine ASD surveillance case status. A child meets the surveillance case definition for ASD if a comprehensive evaluation of that child completed by a qualified professional describes behaviors consistent with the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR) diagnostic criteria for any of the following conditions: autistic disorder, pervasive developmental disorder—not otherwise specified (including atypical autism), or Asperger syndrome. This report provides updated prevalence estimates for ASD from the 2010 surveillance year. In addition to prevalence estimates, characteristics of the population of children with ASD are described.

Results: For 2010, the overall prevalence of ASD among the ADDM sites was 14.7 per 1,000 (one in 68) children aged 8 years. Overall ASD prevalence estimates varied among sites from 5.7 to 21.9 per 1,000 children aged 8 years. ASD prevalence estimates also varied by sex and racial/ethnic groups. Approximately one in 42 boys and one in 189 girls living in the ADDM Network communities were identified as having ASD. Non-Hispanic white children were approximately 30% more likely to be identified with ASD than non-Hispanic black children and were almost 90% more likely to be identified with ASD than Hispanic children. Among the seven sites with sufficient data on intellectual ability, 31% of children with ASD were classified as having IQ scores in the range of intellectual disability (IQ < 70), 23% in the borderline range (IQ = 71–85), and 46% in the average or above average range of intellectual ability (IQ > 85). The proportion of children classified in the range of intellectual disability differed by race/ethnicity. Approximately 48% of non-Hispanic black children with ASD were classified in the range of intellectual disability compared with 38% of Hispanic children and 29% of non-Hispanic white children. The median age of earliest known ASD diagnosis was 53 months and did not differ significantly by sex or race/ethnicity.

Interpretation: These findings from CDC's ADDM Network, which are based on 2010 data reported from 11 sites, provide updated population-based estimates of the prevalence of ASD in multiple communities in the United States. Because the ADDM Network sites do not provide a representative sample of the entire United States, the combined prevalence estimates presented in this report cannot be generalized to all children aged 8 years in the United States population. Consistent with previous reports from the ADDM Network, findings from the 2010 surveillance year were marked by significant variation in ASD prevalence by geographic area, sex, race/ethnicity, and level of intellectual ability. The extent to which this variation might be attributable to diagnostic practices, underrecognition of ASD symptoms in some racial/ethnic groups, socioeconomic disparities in access to services, and regional differences in clinical or school-based practices that might influence the findings in this report is unclear.


Public Health Action: ADDM Network investigators will continue to monitor the prevalence of ASD in select communities, with a focus on exploring changes within those communities that might affect both the observed prevalence of ASD and population-based characteristics of children identified with ASD. Although ASD is sometimes diagnosed at a young age, the median age of the first ASD diagnosis is still relatively late.

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MMWR / March 26, 2014 / Vol. 63, No. 12

2018

Autism and Developmental Disabilities Monitoring Network 1



Community Report on Autism 2018



1 in 59 children living in ADDM sites are identified with ASD



Why is this information important and how can it be used?

For over a decade, CDC's ADDM Network has been at the forefront of documenting the changing number and characteristics of children with ASD. Findings from the ADDM Network have laid the foundation for research into who is likely to develop ASD, why ASD develops, and how best to support individuals, families, and communities affected by ASD. Service providers (such as healthcare organizations and school systems), researchers, and policymakers can use ADDM Network findings to support service planning, guide research on the factors that put a child at risk for ASD and the interventions that can help children with ASD, and inform policies that promote improved outcomes in health care and education. In particular, targeted strategies are needed to

1. Lower the age of first evaluation by community providers; and
2. Increase awareness of ASD among black and Hispanic families, and identify and address barriers in order to ensure that all children with ASD are evaluated, diagnosed, and connected to services.

CDC will continue tracking the number and characteristics of children with ASD, researching what puts children at greater risk for ASD, and promoting early identification, the most powerful tool we have now for making a difference in the lives of children with ASD.



1.7% children living in ADDM sites were identified with ASD

National Center on Birth Defects and Developmental Disabilities 3

2020!!!



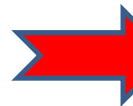
AUTISM AND DEVELOPMENTAL DISABILITIES
MONITORING (ADDM) NETWORK



Key Findings At-A-Glance

These findings are based on the analysis of data collected from the health and special education records (if available) of 8-year-old children who lived in one of 11 different areas throughout the United States in 2016.

- The estimated percentage of 8-year-old children identified with ASD is higher than previous estimates from the ADDM Network.
- For the first time, ADDM Network data found no overall difference in the number of black children identified with autism compared to white children. However, the number of Hispanic children identified with autism is still lower compared to white or black children.
- Overall, progress has been made toward the [Healthy People 2020](#) goal of increasing the percentage of children with ASD who receive their first developmental evaluation by 36 months.
- More children who were born in 2012 received an ASD diagnosis by 4 years of age compared to children born in 2008.



1 in 54
8-year-old children
identified with ASD
in 2016

*Based on tracking within 11 communities in the United States

The 2020 Community Report on Autism highlights the ADDM Network's most recent findings on ASD in 8-year-old children, showing that the estimated percentage of children identified with ASD is higher than in previous reports. In 8-year-old children, about 1.85%, or 1 in 54, were identified with ASD in 2016, based on tracking within 11 communities

in the United States. While these findings indicate that there continue to be many children living with ASD who need services and support, now and as they grow into adolescence and adulthood, they also offer good news that screening and awareness continue to identify children who will benefit from services.

2021



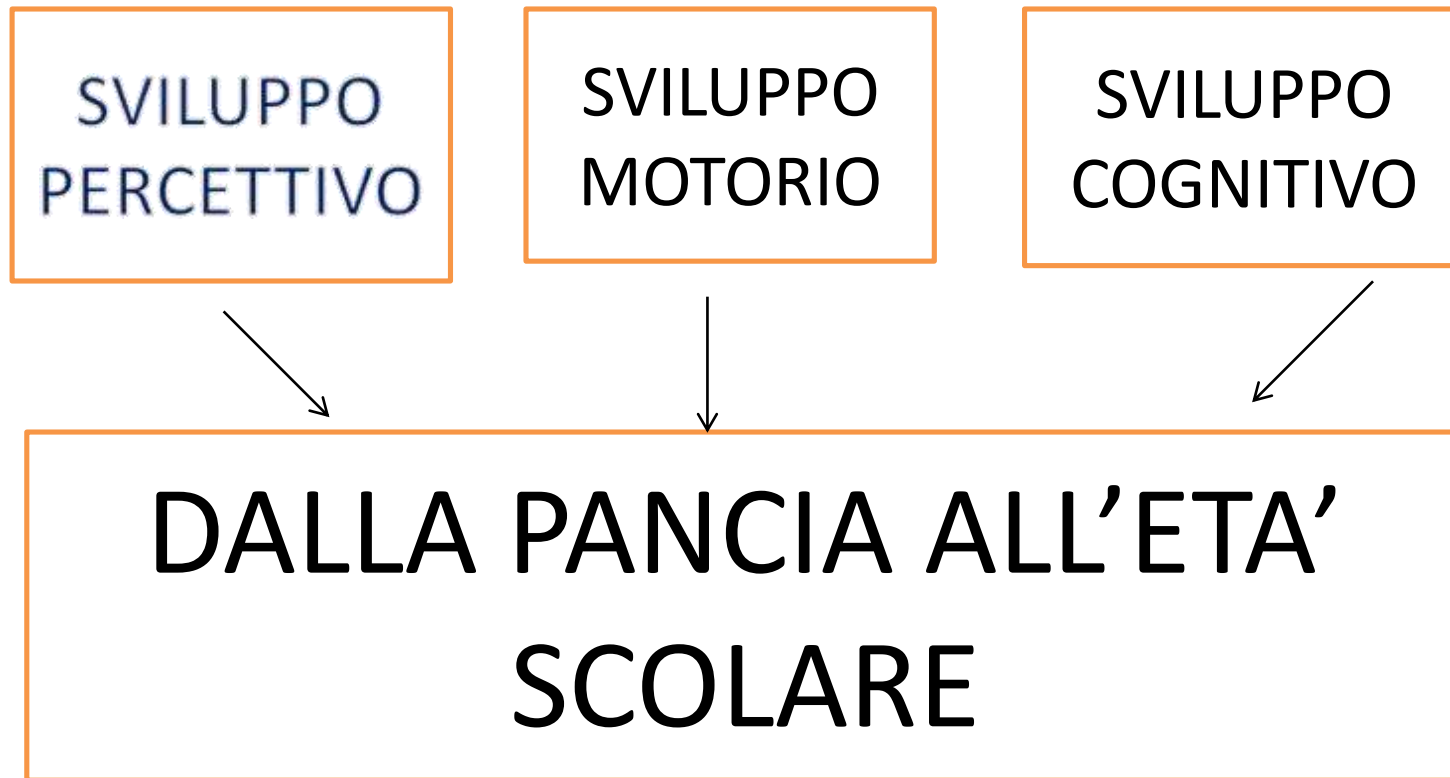
AUTISM AND DEVELOPMENTAL DISABILITIES
MONITORING (ADDM) NETWORK



- The 2021 Community Report on Autism highlights the ADDM Network's most recent findings on ASD in 8-year-old and 4-year-old children. Data reported on 8-year-old children give us a comprehensive picture of the number and characteristics of children identified with ASD, while data reported on 4-year-old children tell us more about progress in the early identification of ASD.
- The ADDM Network found that 1 in 44 (2.3%) 8-year-old children were identified with ASD in 2018, based on tracking within 11 communities in the United States. The estimated percentage of children identified with ASD is higher than in previous reports, though participating communities have changed over time. These findings indicate there are many children with ASD who need services and support now and as they grow into adolescence and adulthood.

• **1 in 44**

SVILUPPO NEURO-SENSO-MOTORIO



FATTORI PREDITTIVI PER IL NORMALE NEUROSVILUPPO

AGGANCIO
VISIVO

POINTING

IMITATE

NEUROSVILUPPO

- DISTURBO DELLO SVILUPPO INTELLETTIVO
- DISTURBO DELLA COMUNICAZIONE
- DISTURBO DELLO SPETTRO AUTISTICO
- DISTURBO DA DEFICIT DI
ATTENZIONE/IPERATTIVITA'
- DISTURBO SPECIFICO DELL'APPRENDIMENTO
- DISTURBO DEL MOVIMENTO

DISTURBI DEL NEUROSVILUPPO

**DISTURBI CHE INTERESSANO LA FASE
COSTRUTTIVA-NEUROGENESI,
SINAPTOGENESI E PROGRAMMAZIONE
PRECOCE DELLE RETI NEURONALI**

Maternal Autoantibodies in Autism

David Bismuthberg, PhD, July Vande Water, PhD

As epidemiologic studies continue to note a striking increase in rates of autism spectrum disorder (ASD) diagnosis around the world, the lack of identified causative agents in most cases remains a major hindrance in the development of treatment and prevention strategies. Published observations of immune system abnormalities in ASD have increased recently, with several groups identifying fetal protein-reactive IgG antibodies in plasma from mothers of children with autism. Furthermore, other gestational immune parameters, including maternal infection and dysregulated cytokine signaling, have been found to be associated with ASD in some cases. While detailed pathogenic mechanisms remain to be determined, the hypothesis that some cases of ASD may be influenced, or even caused, by maternal fetal brain-reactive antibodies or other in utero immune-related exposures is an active area of investigation. This article reviews the current literature in this area and proposes several directions for future research.

Arch Neurol. 2012;69(6):693-699

Autism spectrum disorders (ASDs) are the most common neurodevelopmental disorders, with a diagnostic incidence of 1:88. Individuals with ASD display notable impairments in communication and social interaction and have restricted interests that often manifest as repetitive stereotypies. Within ASD, individuals may meet diagnostic thresholds in all 3 behavioral domains, resulting in a diagnosis of autistic disorder (AU), in 1 or 2 of the 3 domains (yielding an ASD or Asperger disorder diagnosis), or have suboptimal impairments that differ sufficiently to result in a diagnosis of childhood disintegrative disorder or pervasive developmental disorder-not otherwise specified. Currently, these disorders are behaviorally diagnosed using instruments such as the Autism Diagnostic Interview-Revised¹ and the Autism Diagnostic Observation Schedule,² which evaluate the criteria listed in

the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition, Text Revision).³ Work is currently under way to produce an updated Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition), which is scheduled to be released in May 2013⁴ and will likely combine AU, ASD, Asperger disorder, childhood disintegrative disorder, and pervasive developmental disorder-not otherwise specified into the broad category of ASD, which will include measures of clinical specifier of severity as well as associated clinical features.

Owing to the lack of biochemical diagnostic tools, it is unclear whether the symptoms underlying ASD stem from different etiologies or represent different manifestations of similar genetic or environmental factors. Data from twin studies have supported a strong genetic association with ASD based on high monozygotic twin concordance, and large-scale genetic screens have revealed numerous risk factors,⁵ each with relatively low penetrance, supporting the hypothesis that the behavioral manifesta-

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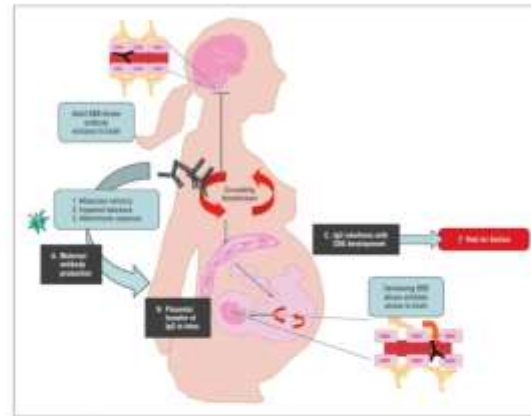


Figure. Schematic representation of maternal antibody-mediated autism. A, Maternal antibodies that bind to fetal brain proteins may cross through 1) an absolute response to a neuronal antigen, 2) required transport mechanisms, or 3) abnormalities in fetal placentas during a normal pregnancy. B, The placenta actively transports maternal IgG into fetal circulation from immunization through gestation. C, Normally, the adult blood-brain barrier (BBB) restricts circulating IgG from the brain parenchyma, with the developing fetal brain a notable exception in maternal IgG during gestation. The presence of maternal fetal brain-reactive IgG during critical windows of neurodevelopment opens a window of potential adverse placental-fetal-neurodevelopmental outcomes (BBB inhibition during normal system).

Maternal IgG and Neurodevelopment

The fetal BBB is not yet fully formed during embryonic development and appears to be notably permeable to factors that enter the fetal circulation across the placenta, including IgG. Women with systemic lupus erythematosus, which is associated with autoantibodies recognizing both the 5'-methyl CpG dinucleotide receptor and double-stranded DNA, often have children with learning disabilities whereas children born to fathers with systemic lupus erythematosus do not, suggesting a pathogenic role for the antibodies during fetal brain development. Studies in a murine systemic lupus erythematosus model of gestational antibody transfer reveal specific deposition of maternal anti-5'-methyl-CpG dinucleotide IgG to the developing neocortex at 10- to 20-day higher concentrations than in the maternal fetus.^{6,7} Furthermore, an observational study, offspring of women whose antibodies against antibodies displayed impaired performance on a variety of behavioral tests that varied based on antibody titer.

Maternal IgG in Autism

Observational studies, recent in a possible association between maternal antibodies and ASD begin with the observation that gestational exposure to fetal paternally derived lymphocyte antigens elicited an antibody response in many mothers, which was associated with pregnancy complications and autism in a small cohort (Table 1).⁸ These maternal antibodies, which caused complement-dependent cytotoxicity to lymphocytes of the child, were assumed to arise from exposure to paternal antigens during a previous pregnancy similarly to the genesis of anti-B6 antibodies.

Based on some intriguing pilot work from Dehan et al,⁹ we began our search for an association between maternal autoantibodies and autism. Using samples from the Childhood Autism Risk from Genetics and the Environment Study,¹⁰ a large-scale case-control recruited through the Children's Center for Environmental Health at the University of California, Davis, we went on to demon-

Original Investigation | Psychiatry

Association of Cesarean Delivery With Risk of Neurodevelopmental and Psychiatric Disorders in the Offspring: A Systematic Review and Meta-analysis

Tengyang Zhang, MD; Anca Seleznich, MD, PhD; Laura Stella-Camerini, MD; Nico Haljans-Peters, MD; Zheng Chang, PhD; Henrik Larsson, PhD; Susmita Mazumdar, PhD; Lorena Fernandez-Alfonso, PhD

Abstract

IMPORTANCE: Birth by cesarean delivery is increasing globally, particularly cesarean deliveries without medical indication. Children born via cesarean delivery may have an increased risk of negative health outcomes, but the evidence for psychiatric disorders is incomplete.

OBJECTIVE: To evaluate the association between cesarean delivery and risk of neurodevelopmental and psychiatric disorders in the offspring.

DATA SOURCES: Ovid MEDLINE, Embase, Web of Science, and PsycINFO were searched from inception to December 10, 2018. Search terms included all main mental disorders in the *Diagnostic and Statistical Manual of Mental Disorders* (4th Edition).

STUDY SELECTION: Two researchers independently selected observational studies that examined the association between cesarean delivery and neurodevelopmental and psychiatric disorders in the offspring.

DATA EXTRACTION AND SYNTHESIS: Two researchers independently extracted data according to Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) and Meta-analysis of Observational Studies in Epidemiology (MOOSE) reporting guidelines and assessed study quality using the Newcastle-Ottawa Scale. Random-effects meta-analysis were used to pool odds ratios (ORs) with 95% CIs for each outcome. Sensitivity and influence analyses tested the robustness of the results.

MAIN RESULTS AND MEASURES: The ORs for the offspring with any neurodevelopmental or psychiatric disorder who were born via cesarean delivery compared with those were born via vaginal delivery.

RESULTS: A total of 6952 articles were identified, of which 61 studies comprising 62 independent samples were included, totaling 20 601 939 deliveries. Compared with offspring born by vaginal delivery, offspring born via cesarean delivery had increased odds of autism spectrum disorders (OR, 1.33; 95% CI, 1.25-1.41; $I^2 = 69.5%$) and attention-deficit/hyperactivity disorder (OR, 1.17; 95% CI, 1.07-1.28; $I^2 = 79.2%$). Estimates were less precise for intellectual disabilities (OR, 1.83; 95% CI, 0.90-3.70; $I^2 = 88.2%$), obsessive compulsive disorder (OR, 1.40; 95% CI, 0.87-2.30; $I^2 = 67.3%$), tic disorders (OR, 1.31; 95% CI, 0.94-1.81; $I^2 = 75.6%$), and eating disorders (OR, 1.18; 95% CI, 0.90-1.45; $I^2 = 52.7%$). No significant associations were found with depression, affective psychosis, or nonaffective psychosis. Estimates were comparable for emergency and elective cesarean delivery. Study quality was high for 82% of the cohort studies and 50% of the case-control studies.

Key Points

Question: Is birth by cesarean delivery associated with an increased risk of neurodevelopmental and psychiatric disorders in the offspring compared with birth by vaginal delivery?

Findings: In this systematic review and meta-analysis of 61 studies comprising more than 20 million deliveries, birth by cesarean delivery was significantly associated with autism spectrum disorder and attention-deficit/hyperactivity disorder.

Meaning: The findings suggest that understanding the potential mechanisms behind these associations is important, especially given the increase in cesarean delivery rates for nonmedical reasons.

Supplemental content

Author disclosures of potential conflicts of interest and author contributions are found at the end of this article.

Downloaded From: <https://jamanetwork.com/> on 10/23/2018

Abstract (continued)

CONCLUSIONS AND RELEVANCE: The findings suggest that cesarean delivery births are associated with an increased risk of autism spectrum disorder and attention-deficit/hyperactivity disorder, irrespective of cesarean delivery modality, compared with vaginal delivery. Future studies on the mechanisms behind these associations appear to be warranted.

JAMA Network Open. 2019;2(8):e190226. doi:10.1001/jamanetworkopen.2019.0226

DOHaD


DEVELOPMENTAL ORIGINS OF HEALTH AND DISEASE

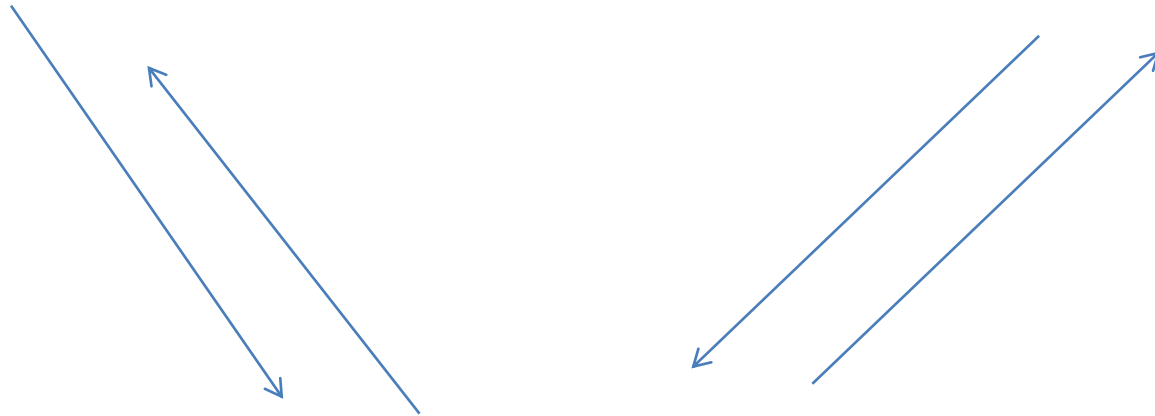
- CONDIZIONI MATERNO-FETALI DI STRESS PERSISTENTE
- INFIAMMAZIONI E/O INFEZIONI CRONICHE
- ESPOSIZIONE MATERNO-FETALE A MIGLIAIA DI MOLECOLE DI SINTESI POTENZIALMENTE NEUROTOSSICHE (METALLI PESANTI, PESTICIDI, PERTURBATORI ENDOCRINI) PRESENTI NELLA PLACENTA NEL SANGUE CORDONALE E NEL LATTE MATERNO CHE AGISCONO SULL'EMBRIONE E SUL FETO DA PSEUDO-MORFOGENI IN GRADO DI DISTURBARE IL FETAL PROGRAMMING

PANDEMIA!

- LE MODIFICHE GENOMICHE FONDAMENTALI SONO ESSENZIALMENTE EPIGENETICHE CON ORIGINE IN EPOCA EMBRIOFETALE O GAMETICA
- SI TRATTA DI MODIFICHE ESTREMAMENTE VARIABILI DA CASO A CASO
- ORIGINE COMUNE DEI DISTURBI DEL NEUROSVILUPPO DA CONDIZIONI INFIAMMATORIE IN UTERO

EMBODIED COGNITION

PERCEZIONE  AZIONE



COGNIZIONE

EMBODIED COGNITION

IL CORPO E' FRA I PROTAGONISTI DELLA
COGNIZIONE



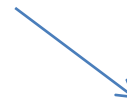
COSA ACCADE QUANDO IL CORPO E'
DISFUNZIONALE?

PERCEZIONE

Enterocezione/esterocezione



Amigdala



Neurovegetativo

Neuroendocrino



Corteccia Parietale Sensoriale= Insula

MICHAEL J. SHEA

POICHE' L'EMISFERO DESTRO DEL BAMBINO SI SVILUPPA PER PRIMO, LO SVILUPPO EMOTIVO E' PRIMARIO E COSTITUISCE LA BASE DI TUTTI GLI ALTRI SVILUPPI SOCIALI

DURANTE I PRIMI DUE ANNI DI VITA AVREMO LO SVILUPPO DELL'AUTOREGOLAZIONE DELLE EMOZIONI E DEL SISTEMA NEUROVEGETATIVO IN BASE ALL'ATTACCAMENTO FRA LA MAMMA E IL BAMBINO

TEORIA DEI MARCATORI SOMATICI DI DAMASIO

**AD UNA PERCEZIONE E'
LEGATO UNO STATO
SOMATICO**

IL CERVELLO IN AZIONE

**IL CICLO RIFLESSO PERCEZIONE-AZIONE
E' FORTEMENTE MODULATO
DALL'ASPETTO EMOTIVO LEGATO ALLO
STATO SOMATICO ASSOCIATO AD UNA
PERCEZIONE**

F.ANSERMET e PIERRE MAGISTRETTI

AZIONE

- **IL COMPORTAMENTO E' PORTARE CUM... SE LA PERCEZIONE INTEGRATA DI INTEROCEZIONE ED ESTEROCEZIONE**
- **COMPORTAMENTO E' AGIRE**
- **LA PERCEZIONE ATTIVA UNO STATO SOMATICO CHE TRAMITE L'AZIONE CORTOCIRCUITA LA RAGIONE**
- **L'OSTEOPATA SI INSERISCE IN QUESTO SISTEMA METTENDO A DISPOSIZIONE DEL CERVELLO L'INTEGRITA' DELLA STRUTTURA, DEL CORPO**

PLASTICITA'

NEL CASO DEI CIRCUITI
NEURONALI SI TRATTA
DELLA CAPACITA' CHE
HANNO I NEURONI DI
MODIFICARE
L'EFFICACIA CON CUI
TRASMETTONO LE
INFORMAZIONI (BEAR,
2003)



PLASTICITA'

IL NOSTRO CERVELLO:

- REGISTRA IN MODO PERSISTENTE NEI CIRCUITI NEURALI LE INFORMAZIONI PROVENIENTI DAL NOSTRO AMBIENTE ESTERNO E INTERNO
- PERMETTE ALLE ESPERIENZE VISSUTE DA CIASCUN INDIVIDUO DI LASCIARE UNA TRACCIA IN QUEI CIRCUITI

Vanadia E., Di Renzo M., Trapolino E., Racinaro L., Rea M., “The relationship between Regulation Disorders of Sensory Processing (RDSP) and white matter abnormalities”,

Journal of Neurology and Neuroscience, 2016, 7, 3:108, pp. 1-7.

Nel campo delle neuroscienze dello sviluppo le acquisizioni più recenti confermano la grande plasticità del sistema nervoso nei primi anni di vita, sia nel caso di sviluppo tipico che in presenza di anomalie genetiche o lesionali. La plasticità è maggiore nei cosiddetti “periodi critici”, in cui è maggiore la capacità da parte dell’ambiente di esercitare un’influenza positiva, ma potenzialmente anche negativa (“maladaptive plasticity”), sullo sviluppo del sistema nervoso (Cioni et al., 2011). Queste scoperte rendono sempre più rilevante nell’ambito della ricerca clinica e nell’organizzazione sanitaria il peso da attribuire alla diagnosi precoce ed al trattamento tempestivo delle disabilità dello sviluppo, dai disturbi motori a quelli sensoriali ed anche ai disordini della vita mentale e relazionale. La ricerca nel campo della salute mentale infantile ha portato ad una importante trasformazione delle conoscenze dei disturbi psicopatologici precoci. Parallelamente grande attenzione è stata ed è rivolta ai cosiddetti disturbi “minori” dello sviluppo percettivo –motorio, tra i quali i disturbi della coordinazione motoria (DCD), il disturbo attentivo-percettivo-motorio (DAMP) ed il disturbo della regolazione della processazione sensoriale(DRPS), riconducibili nella maggior parte, se non nella totalità dei casi, ad una disfunzione nel processamento e/o nell’integrazione delle informazioni senso-percettive; questo aspetto rimanda ai concetti di “connettività” e di “sistema”, nella misura in cui non è necessaria una lesione macroscopicamente evidente per l’instaurarsi dei disturbi, ma è piuttosto ipotizzabile un disfunzionamento dei circuiti e dei fasci di fibre intra-ed interemisferiche che li sottendono.

L'ESPERIENZA LASCIA UNA TRACCIA

- LA TRACCIA PUO' ESSERE RIATTIVATA GRAZIE A PERCEZIONI SIA INTERNE CHE ESTERNE
- PROCESSI DI ASSOCIAZIONE FRAMMENTAZIONE FUSIONE DEFORMAZIONE REGISTRANO PIU' VOLTE LA STESSA TRACCIA
- LA PERCEZIONE DIVENTA UN ELEMENTO DETERMINANTE DEL VISSUTO ESPERIENZIALE (VISTA UDITO OLFATTO SISTEMA VISCERALE SISTEMA MUSCOLOSCHIEETRICO MONDO ESTERNO)

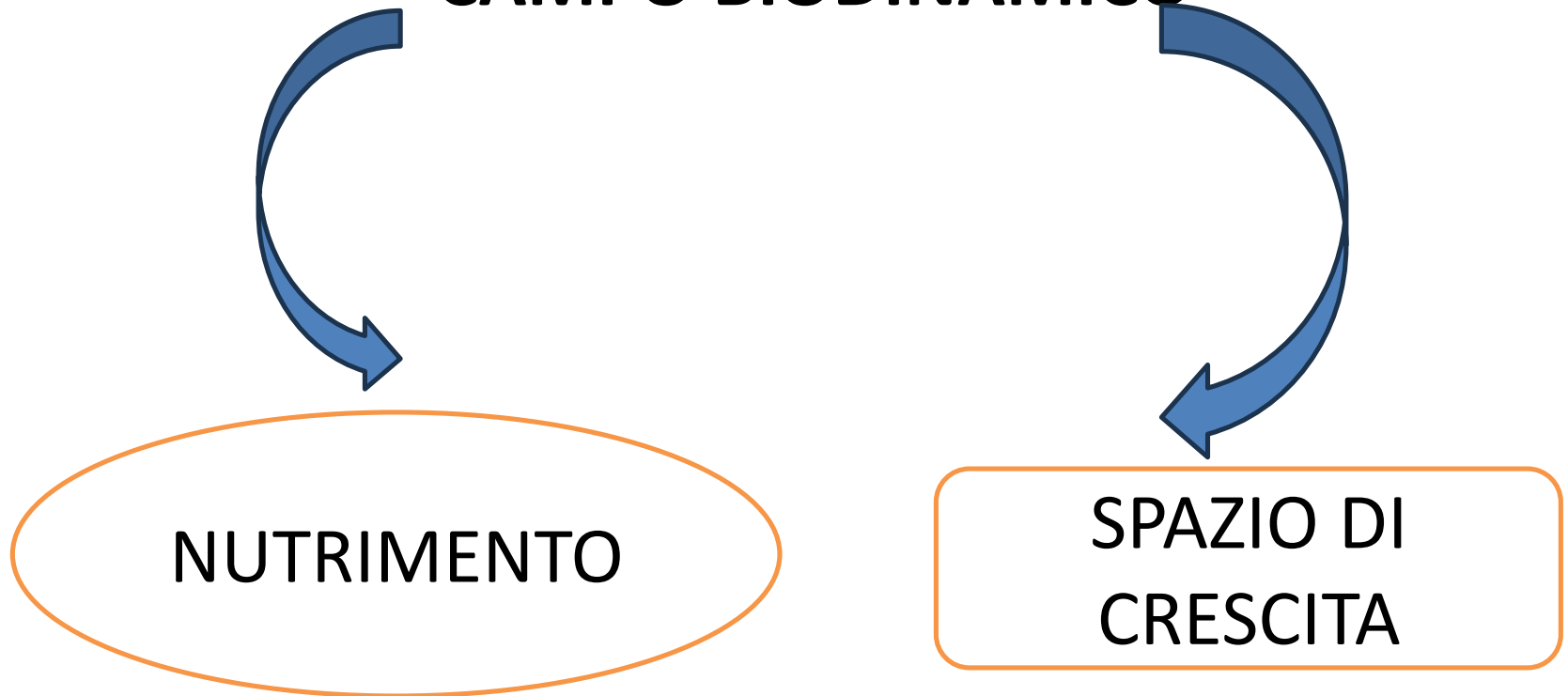
OSTEOPATIA

**QUALE
BAMBIN
O?**



EMBRIOLOGIA

LO SVILUPPO DELL'EMBRIONE AVVIENE IN UN
CAMPO BIODINAMICO



LE ORIGINI DEL SETTING

IL PRIMO AD UTILIZZARE TECNICAMENTE IL TERMINE SETTING FU **DONALD WINNICOTT**, DEFINENDOLO COME LA “SOMMA DI TUTTI I PARTICOLARI DELLA TECNICA” (WINNICOTT, 1941), E COME “IL CONTENITORE CHE PERMETTE AL PASSATO DEL PAZIENTE DI ESSERE IL PRESENTE NELLO STUDIO DELL'ANALISTA” (WINNICOTT, 1956); IL SETTING HA, IN QUEST'OTTICA, UNA FUNZIONE DI HOLDING, DI CURA E CONTENIMENTO.

Minor physical anomalies and behavior in children: a review

- **Abstract**
- The recent literature concerning minor physical anomalies (MPA) and their relation to behavior is reviewed. Research seems to indicate that for males there is considerable consistency in the results but the finding with females is tenuous at best. It appears that a high number of MPA are evident in several pathological groups of boys, as compared with normal controls. In addition, there is a suggestion that MPA are correlated with severity of hyperactivity, IQ, and school achievement. Furthermore, there is also a relationship between a high number of MPA and obstetrical complications. **The etiology of MPA and their utility in predicting pathological behavior is discussed.**

Mapping the Relationship between Dysmorphology and Cognitive, Behavioral, and Developmental Outcomes in Children with Autism Spectrum Disorder

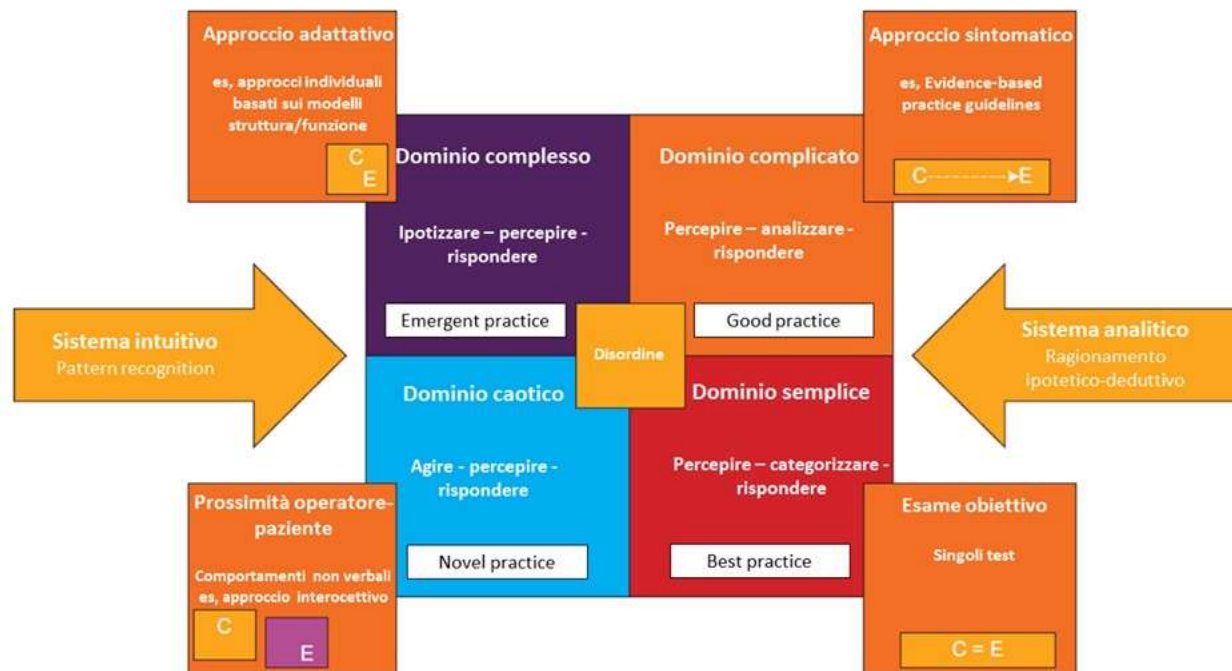
- **Abstract**
- Previous studies investigating the association between dysmorphology and cognitive, behavioral, and developmental outcomes among individuals with autism spectrum disorder (ASD) have been limited by the binary classification of dysmorphology and lack of comparison groups. We assessed the association using a continuous measure of dysmorphology severity (DS) in preschool children aged 2-5 years (322 with ASD and intellectual disability [ID], 188 with ASD without ID, and 371 without ASD from the general population [POP]). In bivariate analyses, an inverse association between DS and expressive language, receptive language, fine motor, and visual reception skills was observed in children with ASD and ID. An inverse association of DS with fine motor and visual reception skills, but not expressive language and receptive language, was found in children with ASD without ID. No associations were observed in POP children. These results persisted after exclusion of children with known genetic syndromes or major morphologic anomalies. Quantile regression models showed that the inverse relationships remained significant after adjustment for sex, race/ethnicity, maternal education, family income, study site, and preterm birth. DS was not associated with autistic traits or autism symptom severity, behaviors, or regression among children with ASD with or without ID. Thus, DS was associated with a global impairment of cognitive functioning in children with ASD and ID, but only with fine motor and visual reception deficits in children with ASD without ID. A better understanding is needed for mechanisms that explain the association between DS and cognitive impairment in children with different disorders. *Autism Res* 2020, 13: 1227-1238. © 2020 International Society for Autism Research, Wiley Periodicals, Inc. LAY SUMMARY: We examined whether having more dysmorphic features (DFs) was related to developmental problems among children with autism spectrum disorder (ASD) with or without intellectual disability (ID), and children without ASD from the general population (POP). Children with ASD and ID had more language, movement, and learning issues as the number of DFs increased. Children with ASD without ID had more movement and learning issues as the number of DFs increased. These relationships were not observed in the POP group. Implications are discussed.

Perinatal Factors in Newborn Are Insidious Risk Factors for Childhood Autism Spectrum Disorders: A Population-based Study

- **Abstract**

- We analyzed claims data from the Taiwan National Health Insurance database, which contains data of 23.5 million Taiwan residents. We included children born after January 1, 2000 who had received a diagnosis of autism spectrum disorders (ASD). Patients who were not diagnosed with ASD were included in the control group. The ASD prevalence was 517 in 62,051 (0.83%) children. Neonatal jaundice, hypoglycemia, intrauterine growth retardation (IUGR), and craniofacial anomalies (CFA) differed significantly between the ASD and control groups. After logistic regressive analysis, the adjusted odds ratios of IUGR, CFA, neonatal hypoglycemia, and neonatal jaundice were 8.58, 7.37, 3.83, and 1.32, respectively. Those insidiously perinatal risk factors, namely CFA, IUGR, neonatal hypoglycemia, and neonatal jaundice, could increase the risk of ASD.

Lunghi, C., & Baroni, F. (2019). Cynefin Framework for Evidence-Informed Clinical Reasoning and Decision-Making. The Journal of the American Osteopathic Association, 119(5), 312-321



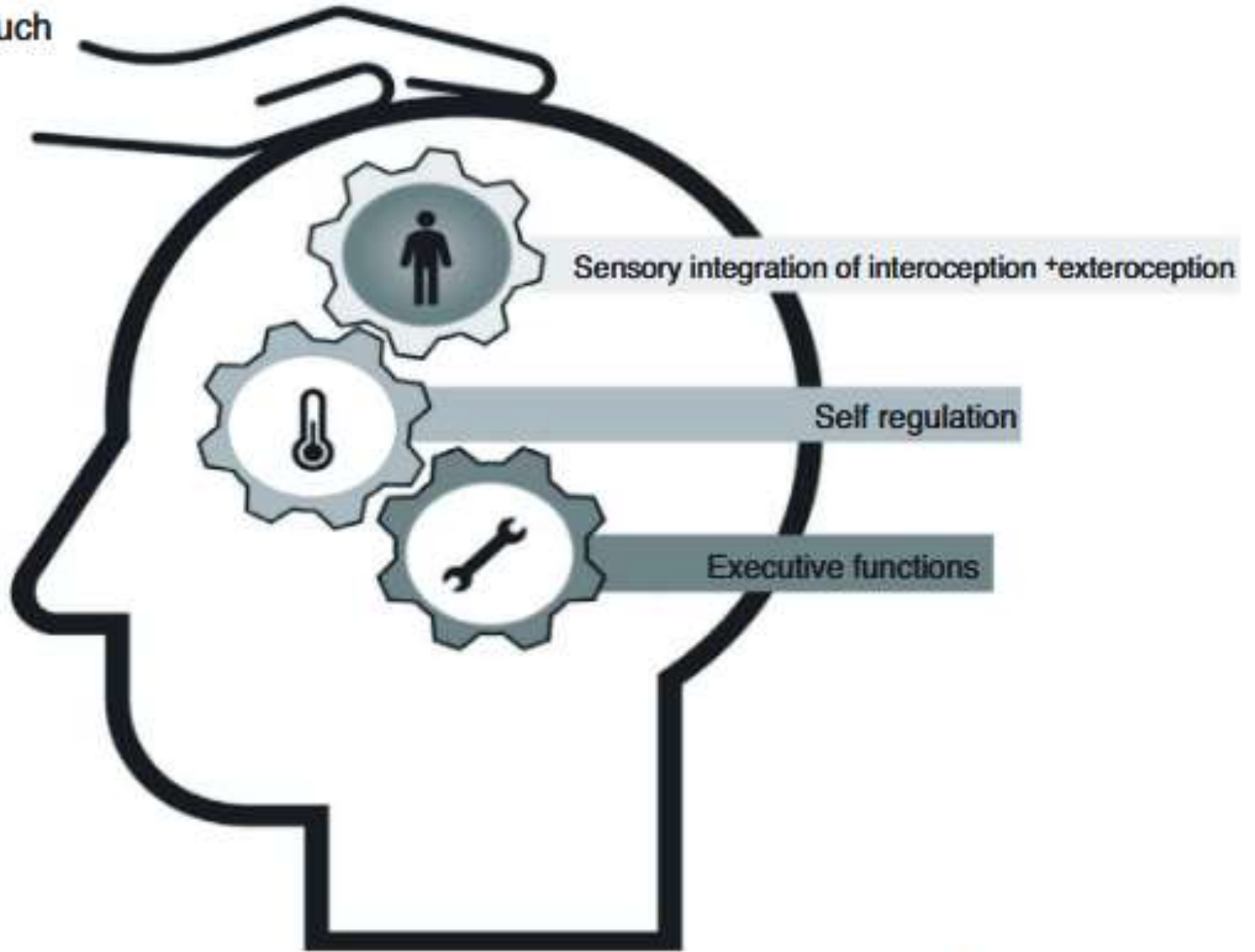
DIAGNOSI PALPATORIA INIZIALE

STRUTTURALI

MEMBRANOSI

**TEST DI COMPRESSIONE CRANIALE
TEST DI DECOMPRESSIONE CRANIO-OCCIPITALE**

Affective touch



Current Opinion in Behavioral Sciences

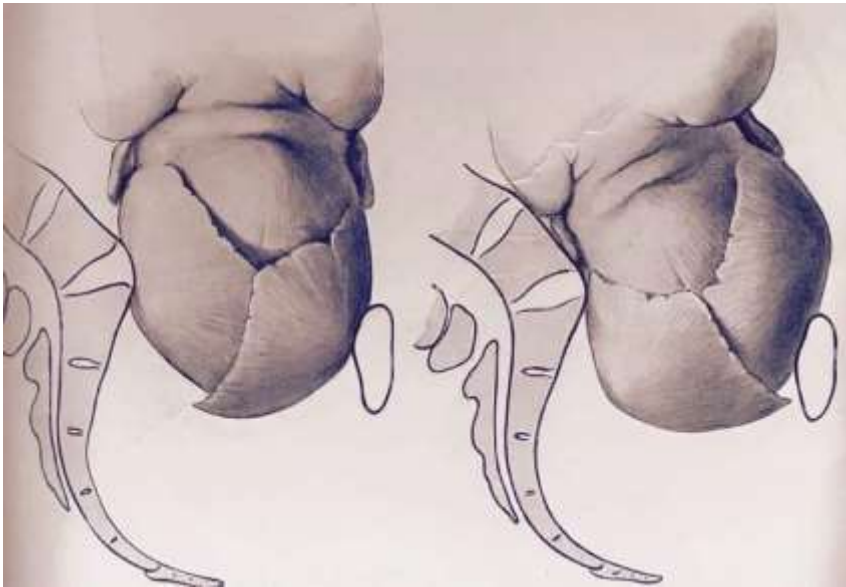
TEST DI COMPRESSIONE CRANIALE



TEST DI DECOMPRESSIONE CRANIO- OCCIPITALE



STRUTTURALI



AVVENIMENTI
SUBANATOMICI
NON CONSIDERATI
IMPORTANTI
H.MAGOUN

STRUTTURALI



1. **PLAGIOCEFALIA**
2. **LESIONI INTRAOSSEE**
3. **ALTERAZIONE DELLA SUZIONE**
4. **ALTERAZIONE DELLA MECCANICA RESPIRATORIA**
5. **IPERSENSIBILITA' CUTANEA**
6. **PIANTO INCONSOLABILE**
7. **DISTURBI ORGANICI DELLA SFERA GASTROINTESTINALE E/O OTORINOLARINGOIATRICA**
8. **DISTURBI VISUO-POSTURALI**
9. **DOLORE**
10. **ASIMMETRIE POSTURALI**
11. **RITARDO MOTORIO**
12. **DISFUNZIONI VERTEBRALI**
13. **TEST DI DECOMPRESIONE CRANIO CERVICALE POSITIVO**
14. **IPERREATTIVI**
15. **PARTO TRAUMATICO**
16. **SELETTIVITA' ALIMENTARE**
17. **DISTURBI DEL SONNO**

BAMBINI MEMBRANOSI

10

Pre-, Peri-, and Neonatal Factors in Autism

LUKE Y. TSAI

It is clear from previous chapters that autism is now considered a syndrome due to a neuropathology of the central nervous system, which, in turn, may have a variety of etiologies. Studies have found that many autistic children suffer from organic brain disorders, ranging from 30 to 100%, depending on whether the children were selected from psychiatric or pediatric-neurologic cohorts (Fish & Rivo, 1979). A wide variety of neurologic disorders have been reported, including cerebral palsy, maternal rubella, toxoplasmosis, tuberculous sclerosis, cytomegalovirus infection, demyelinating disease, lead encephalopathy, meningitis, encephalitis, severe brain hemorrhage, phenylketonuria, and many types of epilepsy.

There are also studies that show autistic children exhibiting substantial excess of congenital minor physical anomalies (Carpbell, Geller, Small, Petti, & Ferris, 1978) as well as soft neurological signs such as hypotonia or hypertonia, disturbance of body schema, clonus, choreiform movements, pathological reflexes, myoclonic jerking, drooling, abnormal posture and gait, dystonic posturing of hands and fingers, tremor, ankle clonus, emotional facial paralysis, and strabismus (reviewed by Ornitz & Rivo, 1976).

Since many of these neurological disorders and/or congenital physical anomalies tend to derive from unfavorable pre-, peri-, and neonatal complications, it has been suggested that pre- or perinatal insults to the brain are the biological causation of autism for children whose autistic symptoms are manifested from birth, and that postnatal cerebral infections or injuries have been suggested as the etiology for children whose autism is manifested after a period of apparent normal development.

The pre-, peri-, or postnatal etiology of autism can stem from genetic defects and/or vulnerability, or from conditions in the uterine environment that make for physical anomalies in the fetus and neonate. The genetic aspect of autism is discussed in Chapter 5. This chapter is concerned primarily with the relationship between autism and pre-, peri-, and neonatal complications.

Many investigators have evaluated pre-, peri-, and neonatal complications in children classified as psychotic or autistic in their early years (Bonder, 1973; Bonder & Farenta, 1961;

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LUKE Y. TSAI

DeMyer, 1979; Deykin & MacMahon, 1979, 1980; Finegan & Quarrington, 1979; Funderbark, Carter, Tangay, Fierman, & Westlake, 1983; Gillberg, 1980; Gillberg & Gillberg, 1983; Gittelman & Birch, 1967; Harper & Williams, 1974; Hirsch, 1963; Knobloch & Pasamanick, 1975; Kolvin, Ounsted, & Roth, 1971; Lohascher, Klinger, & Gabbay, 1970; Osterkamp & Sandt, 1962; Raut & Offord, 1971; Taft & Goldfarb, 1964; Tannis, Lapouse, & Monk, 1964; Torrey, Hersh, & McCabe, 1975; Tsai & Stewart, 1983; Vorsler, 1960; Whittan, Simon, & Mitter, 1965; Wing, O'Connor, & Lotter, 1967). However, one must interpret the results of earlier studies with caution. These studies used different diagnostic criteria, the obstetrical history information was often based on the rather unreliable or inaccurate maternal reports (Harper & Williams, 1974; Kolvin *et al.*, 1971; Wing *et al.*, 1967), or the source of the data was not reported (Knobloch & Pasamanick, 1975; Lohascher *et al.*, 1970). The present chapter, therefore, reviews mainly those studies published since 1975, with the exception of that by Knobloch and Pasamanick (1975). These studies have applied well-defined and internationally accepted operational diagnostic criteria in order to distinguish between autistic and schizotypic children. Furthermore, their data sources were less questionable; that is, original medical records were the source of the obstetrical and neonatal data.

Nevertheless, the interpretation of the results of these selected studies is not easy because these studies have used heterogeneous comparison groups, such as siblings (Deykin & MacMahon, 1980; Finegan & Quarrington, 1979), both mentally retarded and normal nonautistic children (Torrey *et al.*, 1975), same-sex nonautistic children (Gillberg & Gillberg, 1983), and general population data (Finegan & Quarrington, 1979; Gillberg, 1980; Tsai & Stewart, 1983). Furthermore, these studies did not report uniform or comparable types of pre-, peri-, and neonatal complications. The studies that reported relatively comparable types of obstetrical and perinatal complications are listed in Table 1. Blank spaces in the table indicate that no information was available. The diversity among these investigations is immediately apparent.

PRENATAL FACTORS

Maternal Age

It has been suggested that there is a greater risk of birth stress, and associated brain damage, to those infants born to older mothers (Birch & Gussow, 1970). In their investigation of 14 autistic children, Torrey *et al.* (1975) prospectively collected 26 aspects of obstetrical histories, including age of mother at delivery. These authors failed to identify any significant association between maternal age and autism.

Finegan and Quarrington (1979), in a Canadian study of 23 autistic children, found 47.8% of the mothers to be in the age range of 30 to 39 at the time of each child's birth, as compared with 30.5% mothers in the general population. However, the difference was not statistically significant. The same finding was also noted in the comparison between the 15 autistic subjects and their age-closest siblings (*i.e.*, 40% vs. 33%).

DeMyer (1979) reported that the mothers of autistic children in her intensive interview study were significantly older than the mothers of normal controls at the birth of the index child (mean age of the autistic mothers, 28.4 years; mean age of the normal mothers, 24.6 years). Since general population data were not used for comparison, sampling bias may exist in the control group.

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E. Schopler *et al.* (Eds.), *Neurobiological Issues on Autism*.
© Springer Science+Business Media New York 1987



MEMBRANOSI



- **NESSUN VINCOLO STRUTTURALE**
- **STRESS EMOZIONALI PERINATALI**
- **DISTACCHI AFFETTIVI TRAUMATICI**
- **CONDIZIONI DI VITA COMPLESSE**
- **CAMBIAMENTI IMPROVVISI NEI LUOGHI E NELLE ABITUDINI DI VITA**
- **ALTERAZIONE DELLA PERCEZIONE SENSORIALE**
- **ALTERAZIONE DEL RESPIRO**
- **IMPOSSIBILITA' A FAR FRONTE ALLE RICHIESTE**
- **TEST DI COMPRESSIONE CRANIALE POSITIVO**
- **IPOREATTIVI**

NEURAL PATHWAYS OF INTEROCEPTION

- Several pathways have been implicated in the neural processing of interoceptive signals, beginning with a rich interface between autonomic afferents and the central nervous system.
- Relay pathways involve primarily spinal, vagal, and glossopharyngeal afferents, with multiple levels
- of processing and integration in autonomic ganglia and spinal cord.
- Several brainstem (nucleus of the solitary tract, parabrachial nucleus, and periaqueductal gray), subcortical (thalamus, hypothalamus, hippocampus, and amygdala), and cortical regions (insula and somatosensory cortices) represent key afferent processing regions.
- A complementary set of regions involved in visceromotor actions represents key efferent processing regions, including the anterior insula, anterior cingulate,
- subgenual cingulate, orbitofrontal, ventromedial prefrontal, supplementary motor, and premotor areas.
- It is noteworthy that these neural regions coincide closely with other sensory processing systems, especially the nociceptive and affective systems.

Abnormal Pressure Pain, Touch Sensitivity, Proprioception, and Manual Dexterity in Children with Autism Spectrum Disorders

- Children with autism spectrum disorders (ASD) often display an abnormal reactivity to tactile stimuli, altered pain perception, and lower motor skills than healthy children. Nevertheless, these motor and sensory deficits have been mostly assessed by using clinical observation and self-report questionnaires. The present study aims to explore somatosensory and motor function in children with ASD by using standardized and objective testing procedures. *Methods.* Tactile and pressure pain thresholds in hands and lips, stereognosis, proprioception, and fine motor performance of the upper limbs were assessed in high-functioning children with ASD
- ($n = 27$) and compared with typically developing peers ($n = 30$).
- **Results.** Children with ASD showed increased pain sensitivity, increased touch sensitivity in C-tactile afferents innervated areas, and diminished fine motor performance and proprioception
- compared to healthy children. No group differences were observed for stereognosis.
- **Conclusion.** Increased pain sensitivity and increased touch sensitivity in areas classically related to affective touch (C-tactile afferents innervated areas) may explain typical avoiding behaviors associated with hypersensitivity.
- Both sensory and motor impairments should be assessed and treated in children with ASD.

Time to evolve: the applicability of pain phenotyping in manual therapy

- Serotonin and dopamine are altered with OMT and act as pain modulating neurotransmitters altering the affective component of pain.
- The proposed sites of action for both dopamine and serotonin are widespread, including the dorsal horn of the spinal cord, periaqueductal gray, thalamus, basal ganglia, insular cortex, and cingulate cortex.
- Oxytocin is another pain modulating peptide affected by OMT, mitigating pain at the brain and spinal cord level.
- At the spinal level, reviews on both humans and animals have established the effect OMT has on improved descending inhibition. Studies on temporal summation, a measure of dorsal horn excitability, support
- direct inhibition with OMT.

Time to evolve: the applicability of pain phenotyping in manual therapy

- Autonomic nervous system (ANS) response to OMT

is assessed through measuring skin temperature, Skin conduction, heart rate, and cortisol level changes.

- A recent review concluded that OMT techniques affect

the ANS with a combination of sympathetic and parasympathetic nervous system reactions

ROLE OF OXYCOCIN AND OXYTOCIN—REALTED EFFECTS IN MANUAL THERAPIES

MOBERG,K., PETERSSON, M. 2013 I

THE SCIENCE AND CLINICAL APPLICATION OF MANUAL THERAPY. Churchill Livingston-Elsevier, London

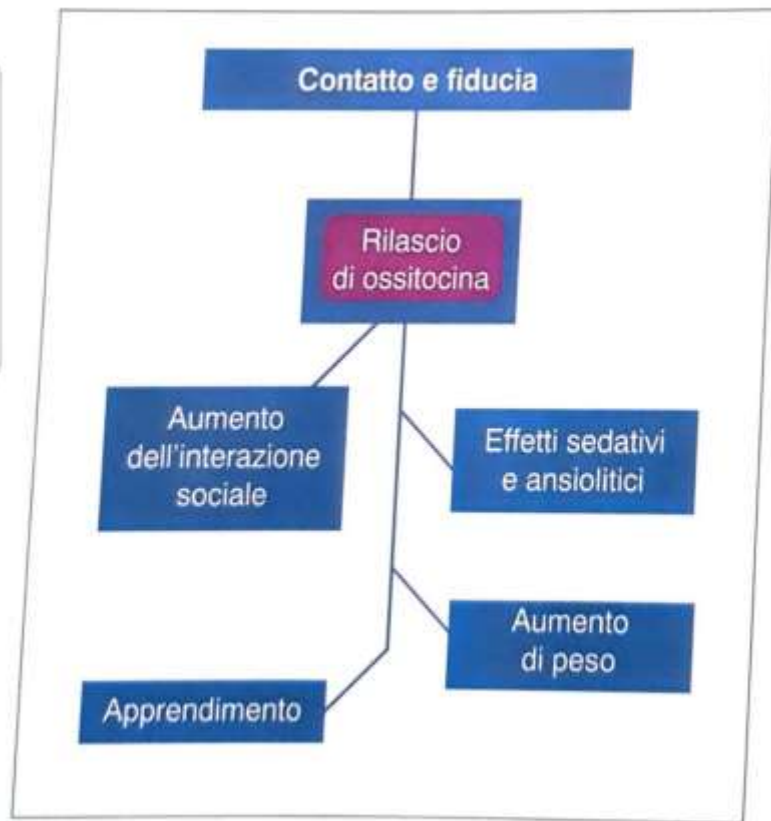


Fig. 2.4 Meccanismi indotti dal rilascio di ossitocina attraverso il contatto (manuale) e la fiducia.

FACILITARE IL CONTATTO
PROLUNGATO DEL
CORPO NELLA ZONA
CORPOREA DISPONIBILE
IN QUEL MOMENTO

SCELTA DELLE TECNICHE OSTEOPATICHE

- STRUTTURALI



- TECNICHE DIRETTE
- POCHE ZONE
CORPOREE
- ATTENDERE LA
RISPOSTA MOTORIA

- MEMBRANOSI



- TECNICHE
CRANIOSACRALI
- UNA ZONA CORPOREA
- ATTIVARE UNA
RISPOSTA INTERNA

DURATA DELL'OMT

- E' IL PAZIENTE IL PROTAGONISTA DEL TRATTAMENTO MANIPOLATIVO OSTEOPATICO
- LA DURATA DIPENDE DA ALCUNI FATTORI:
 1. STATO DI SALUTE
 2. GRAVITA' DELLO SPETTRO
 3. LIVELLO DI ATTENZIONE

SOLITAMENTE IN UNO SPAZIO TERAPEUTICO DI 1
ORA L'EFFETTIVO TRATTAMENTO DURA 20
MINUTI

Osteopathic Evaluation and Positional Plagiocephaly: A Descriptive Study on a Population of Children with ASD

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Abstract: The discipline of osteopathy is a whole person approach that incorporates medical and scientific knowledge using an array of manipulative techniques for diagnosis and treatment of several types of diseases (WHIO). The osteopathic examination allows to locate somatic dysfunctions which are the hallmarks of health imbalance caused by stressful events, external or internal to the body, such as trauma and / or other pathologies. The objective of osteopathic treatment is to improve posture and motor skills, which are the prerequisites for a balanced and harmonious development of the body. The osteopathic evaluation of children with autism spectrum disorder allows the identification of dysfunctional aspects at a somatic level that can enrich the understanding of the child's health and behavior, starting from the structure / function relationship, including craniofacial dimorphisms and plagiocephaly. The present exploratory research has made it possible to detect the presence of signs of plagiocephaly in about half of a sample of 250 preschool and school age children with autism spectrum disorder; the 44% of these, shows signs of craniofacial dysmorphism, which indicates a continuous morphostructural adaptation not yet sufficiently considered as an interferent element in the overall development of the child. The observed incidence is consistent with the incidence of plagiocephaly in the pediatric population and supports the hypothesis that in children with autism spectrum disorder it may be useful to integrate the osteopathic expertise with the other health professionals involved in the diagnostic and therapeutic process. The authors conclude that osteopathic observation can contribute to the definition of the functioning profile of the children with autism spectrum disorder and their needs, in a global perspective of taking charge and individualization of care.

Keywords: Osteopathy, Plagiocephaly, Autism Spectrum Disorders, Evaluation, Treatment

1. Introduction

Autism spectrum disorders (ASD) are included in the DSM-5 [1] (APA, 2013) among neurodevelopmental disorders; the two domains involved by the disorder are divided into social (socio-communicative deficit) and non-social component (restricted and repetitive behaviors and interests, altered sensory processing and perception); due to its pervasiveness, the set of symptoms compromises daily functioning and the onset usually occurs in early childhood.

In recent decades, in literature, have increased those studies investigating the coexistence of alteration of sensory and motor features [2-4] and their involvement in the

pathogenetic process of some forms of autism. In consideration of this, if an osteopath was present within the multidisciplinary teams, a careful diagnostic palpation could also be carried out, to better understand the perceptual and postural-motor structure of the subject and promote health through the use of specific manual techniques aimed at normalizing somatic dysfunctions.

In fact, the contribution of osteopathy integrates the specialist medical clinic from a preventive perspective, especially when somatic dysfunction contributes to generate a fertile ground for a motor, sensory, somatovisceral disorder.

For example, over the years, the osteopathic manipulative treatment (OMT) has been shown to produce an improvement in gastroesophageal reflux symptoms,

including cervical spine mobility and pain [5]. In children with ASD, gastrointestinal symptoms are obviously not included among the diagnostic criteria, but they represent an area of growing interest and could be studied as they often coexist with stereotypies or core behaviors of autism. There are also some clinical conditions (peculiar abdominal pain relief positions, atypical evacuative position with increased abdominal press) or specific eating habits (food selectivity for consistency, high intake of liquids, self-reduction of dairy products and / or carbohydrates) for which the gastroenterological genesis should be carefully evaluated with respect to the neuropsychiatric one and, subsequently, an adequate therapy should be indicated. From this differential perspective, osteopathic palpatory diagnosis plays a supporting role for the clinician and the patient himself.

Furthermore, children with ASD often also present sensory-perceptual and neuropsychological alterations (including dyspraxia) which, although are not predictive or pathognomonic signs of the autism spectrum disorder, are frequently part of the clinical picture and are accompanied by somatic dysfunctions [6]. Some of these are compensatory forms of the organic or neuropsychological disturbance, others are instead determined by structural disharmonies or by alterations in the kinetics such as the reduction of cranial-cervical mobility, the minor extension of the vertebral column, the asymmetry of the shoulder blades or pelvic girdle [7]. Orienting among several types of motor asymmetries and atypia will be useful for the purposes of the differential diagnosis and the therapy to be adopted.

The observation of the general dynamics of the child always highlights crucial elements of evaluation to be integrated with the palpatory diagnosis, such as the general posture and that of the head, walking, motor behavior through the motor patterns implemented in relation to the surrounding environment, or to the people and the stimuli received.

The observation must obviously consider the age of the child to better understand the level of development achieved [8]. Motility, sensory and perception have a circular relationship; the sensory development proceeds with the motor one (sensory-motor development), where the motor component conditions and is conditioned by the sensory [6, 9]. Sensory, which is dysfunctional in most people with ASD, can also be altered by a structural difficulty as often occurs in children with plagiocephaly [10]. In these cases, the reduced mobility of the head with respect to the neck, can contribute to the establishment of a motor asymmetry of the upper limbs, but also of the lower limbs, which in the acquisition of motor stages conditions some developmental steps by adapting them through compensatory motor schemes.

The perception in a state of well-being usually generates an adequate motor behavior, so it is likely that if the child moves in a disorganized way he expresses an internal condition of discomfort and otherwise the perception deriving from an altered motor organization will itself be altered and this may cause further discomfort. In the case of children with kinetic anomalies, it is always useful to investigate whether these constitute a structural constraint or

a response attributable to clinical conditions. We believe that sensoriality finds expression in morphology and body dynamics, which are highlighted through posture; while diaphragmatic dynamics is an adaptive and homeostatic form of the deepest sensoriality, morphology can be present from birth and can interfere with sensoriality. This perspective helps to interpret the presence of plagiocephaly.

1.1. The Plagiocephaly

The term Plagiocephaly derives from the Greek *plagios* (oblique) and *kephalè* (head) which means head distortion and clinically refers to asymmetries of the head [11]. Plagiocephaly is a quantitative descriptive morphological adaptation of cranial asymmetries involving the splanchnocranium in particular, the viscerocranium and the functionality of the organs there included [12].

To date, cranial macro deformities are diagnosed and defined as "plagiocephaly", leaving out all those asymmetries which are less evident in morphological terms, but which always give rise to dynamic compensation both of the bones themselves and of the body in general. Plagiocephalies can be divided into synostotic, nonsynostotic and syndromic; the synostotic plagiocephaly is due to premature closure of the sutures of the cranium; the nonsynostotic plagiocephaly is caused by extrinsic forces acting on the growing skull in the pre or postnatal period (deformational or positional plagiocephaly) [13].

In this study we will deal with the positional plagiocephaly, which do not involve the premature closure of the sutures of the cranium, and which are not associated with other organic / genetic alterations of known origin. According to a 2013 study, the incidence of plagiocephaly in the general population is now estimated at around 46% [14].

In 1992 the American Academy of Pediatrics began the "Back to Sleep" campaign for the prevention of the "sudden infant death syndrome" (SIDS), which indicates, as a fundamental element, the maintenance of the supine position of children during sleep, with the slogan "to sleep tummy up, to play tummy down". Despite of this slogan, the use of the prone position in the first months of life has not been sufficiently considered and supported. This actually led to a reduction in lethal events but caused a marked increase in plagiocephaly. This occurs when the infant is in the same supine position all day and night [15-17].

In addition to determining asymmetries and dysfunctions in the craniofacial district, plagiocephaly also conditions the movements of the head with respect to the neck and subsequently of the neck with respect to the spine, being able to determine, over time, if not adequately managed, scoliotic attitudes (descending scoliosis). Through the atlanto-occipital joint, it gives rise to postural compensations that are highlighted in the vertebral column. Distinguishing the local effects of plagiocephaly from the more general and topographically more distant ones is purely descriptive in consideration of the functional integration of the being but is useful for a better understanding.

As is well known, the development of the skeletal structure and motor control follow a top-down pattern: the articular

limitations of the upper districts can compromise the development of later more evolved functions [18-21]. During the first months of life, the effects of plagiocephaly are mainly highlighted at the craniofacial level, involving many important functions of neurodevelopment, such as vision, balance, sensoriality, orientation of the head in space, sucking, swallowing, breathing, mucus drainage in the middle ear [10, 11]. If there is no alternation of postures and the newborns are always positioned in the same way, the cranial bones, both those of the vault and the cranial base, malleable in the newborn and infant, are deformed.

1.2. The Osteopathic Observation

Osteopathy developed in the middle of the 19th century by Andrew Taylor Still, physician and surgeon of the USA, founder of the first independent osteopathic medical school at the end of the 19th century [22]. Osteopathy is based on physical manipulation of the body's muscle tissue and bones, both in the diagnostic and treatment phase. It respects the relationship between body, mind and spirit in conditions of health and disease; the emphasis is placed on the structural and functional integrity of the organism and on the intrinsic tendency of the latter to self-healing. Osteopaths use a wide range of manual therapeutic techniques, aimed at improving physiological function and / or supporting homeostasis that has been altered by a somatic dysfunction (body structure), for example impairment or alteration of component functions related to the somatic system; skeletal, artrodial and myofascial structures; and the relative vascular, lymphatic and neural elements. Osteopaths, then, use their knowledge on the relationship between structure and function to optimize the body's self-regulation and self-healing abilities.

Plagiocephaly and dysmorphism in neurodevelopmental disorders.

There are several studies in the literature that have investigated the incidence of dysmorphic features in children with neurodevelopmental disorders [23-26], but these usually refer to minor physical anomalies (MPAs), defined as subtle, abnormal morphological features, such as deviations in morphology of the head, eyes, ears, mouth, hands, and feet, while the presence of plagiocephaly is still little investigated. According to Shapira and colleagues, the presence of multiple dysmorphic features in some children with ASD might identify distinct ASD phenotypes and serve as potential markers for understanding causes and prognoses. Their study shows that about 17% of children with ASD had dysmorphism, and these data are consistent with what has been reported by some studies (25.5% in [24]; 15.8% in [27]), but slightly higher than reported by others (10.8% in [25]; 5.6% in [28]).

In a recent study, Tian and colleagues [29] report that dysmorphisms are more common among individuals with ASD, disability, schizophrenia, hyperactivity than in the typically developing population [23, 30, 31]; for which they studied the relationships between dysmorphic characteristics in children with ASD and their cognitive and behavioral development. Their data suggest that the presence of

dysmorphism is associated with decreased language production and comprehension skills in children with ASD, an association not observed in the control population. On the other hand, no associations were found between the presence of dysmorphism and the level of severity of ASD symptoms, as already described by Flor and colleagues [28]. Taken together, these findings suggest that dysmorphisms are only related to a global cognitive functioning of neurodevelopment for children with ID, regardless of ASD status.

Objective of the present research is:

Verify the incidence of positional plagiocephaly in ASD children, the level of severity of the plagiocephaly and the presence of differences due to the age of the children.

2. Methods

2.1. Participants

250 children with ASD, aged between 1.6 and 13.7 years, were recruited. Of these, 120 children (48%) showed signs of plagiocephaly. Children with plagiocephaly were aged from 1.6 to 13.6 years (mean 4.04 years; $sd = 2.19$ years). At the time of the research, 97% of children were under the age of 7. 90% of the children were male ($N = 108$). At the time of data collection for the research, the average score at the ADOS-2 was 17.40 ($sd = 6.94$).

2.2. Procedures

The children in the sample were recruited between 2016 and 2020. All children had received a diagnosis of autism spectrum disorder from public and private territorial services affiliated with the National Health System. The diagnosis was confirmed at the Institute of Ortofonia (IdO) in Rome, where the research was conducted by a multidisciplinary team, with decades of experience, which includes various professionals including as well as osteopaths. All children who showed evident signs of neurological damage or sensory deficit, children who presented craniostenosis and myogenic torticollis were excluded from the sample. The osteopath has been present at the IdO for several years and participates in the global and multidisciplinary assessment of children with ASD.

2.3. Measures

Argenta Classification of Positional Plagiocephaly

Although various methods have been used to quantify and classify positional plagiocephaly, such as computed tomography (CT) or anthropometric measurements, the clinical observation is the simplest and most reliable method. As part of the integrated clinical evaluation shared with other professionals at the IdO, it was decided to use this observational protocol as it was non-invasive and easily usable with children, moreover corroborated by the palpatory examination, and therefore it proved to be a suitable tool for the research.

The Argenta is a clinical scale based on the morphological classification of positional plagiocephaly into 5 types,

depending on the severity of the asymmetry of the skull, the position of the ear and the appearance of the face, which is asymmetrical in the forms of greater severity, without taking into account the pathogenetic mechanism of the shape [32] (Figure 1):

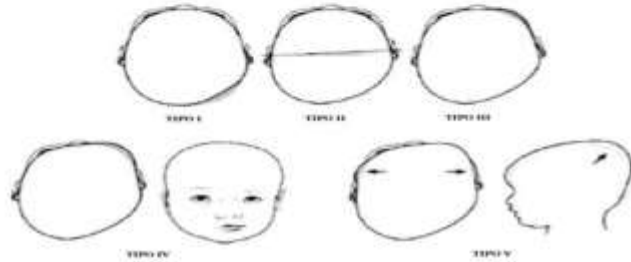


Figure 1. The Argenta classification, a clinical 5-point scale of DP.

Type I: The cranial asymmetry is limited to the back of the skull. The degree of posterior flattening may vary, but the deforming action is limited to this anatomical region. There is no ear asymmetry assessed by measuring the nose-to-ear distance. The frontal squama is symmetrical, there are no anomalous temporal protrusions or vertical elongation of the skull. This represents the mildest form of positional plagiocephaly.

Type II: In this type of deformity, there are varying degrees of posterior cranial asymmetry. The effect on the medio cranial line and on the skull base, which determines the displacement of the ear on the involved side, forward or downward or in both directions, is quite significant. The asymmetry is usually more evident when examining the child from above. The anterior skull is not involved, and the frontal bone is symmetrical. There is no facial asymmetry. There are no compressive deformities of the skull. This type identifies a more severe form of positional plagiocephaly affecting not only the posterior skull but also the skull base and the central temporal fossa.

Type III: This type of deformity includes posterior flattening, ear shift and forehead asymmetry. This leads to cranial deformity, typically resulting in a parallelogram-shaped skull, characteristic of positional plagiocephaly and more easily found by examining the child directly from above. The face is symmetrical.

Type IV: This deformity, which includes posterior flattening, ear shift, forehead asymmetry and frontal and / or parietal sloping, begins to affect the position of the eyes, cheekbones, jaw, and nasal septum, causing asymmetry in the baby's face. Facial asymmetry is the result of the displacement of the adipose tissue of the cheek or, less frequently, hyperplasia of the ipsilateral zygomatic area. This deformity reflects the progressive nature of the cranial asymmetry that comes to involve the anterior region causing deformation of the face.

Type V: In these patients the deformity includes posterior

flattening, ear shift, forehead asymmetry, orbital, cheek, face or jaw deformity, frontal and / or parietal sloping, temporal bossing and increased cranial vault height.

All patients are clinically examined in four positions:

The first involves the observation of the child while he has a straightforward gaze position. This allows the observer to determine if there are asymmetries of the forehead and face. The second examination position takes place with the child seated, and the head is observed from above, while the child looks straight ahead. This allows for evaluation of forehead asymmetry, posterior cranial asymmetry, and ear malposition. The third position of the clinical examination takes place by looking at the back of the child's skull. This position allows confirmation of ear position and posterior asymmetry. The fourth examination position takes place by observing the child from a lateral position. This allows the observer to determine any degree of abnormal vertical growth of the skull, which can occur in severe plagiocephaly. Abnormalities are clinically visible or classified as present or not. For each of the five observed types of plagiocephaly, the practitioner assigns a score ranging from Level 0 (indicating no clinical sign) to Level 3 (significant presence of plagiocephaly signs).

3. Results

3.1. Descriptive

Of the 250 children with ASD who had the osteopathic examination, 120 children (48%) were found to have at least one sign of plagiocephaly. 90% of children with plagiocephaly are boys (N = 108) and for this reason gender differences have not been analyzed. At the time of assessment, they were 18 months to 164 months (mean 48.4 months; sd = 26.3 months); 97% were under the age of 7. As can be seen in Table 1 (Total column), among the 5 types of plagiocephaly the most detected is Type V.

Table 1. Frequency (and percentage) of children showing signs of plagiocephaly, in each of the 5 types (N = 120).

| Type | Level 1 | Level 2 | Level 3 | Total on 250 |
|------|------------|------------|----------|--------------|
| III | 2 (0.8%) | 1 (0.4%) | 1 (0.4%) | 4 (1.6%) |
| IV | 3 (1.2%) | 2 (0.8%) | 0 (0%) | 5 (2%) |
| V | 59 (23.6%) | 47 (18.8%) | 5 (2%) | 111 (44.4%) |

3.2. Gender and Age Differences in the Distribution of Plagiocephaly Typology

No differences emerged in the frequency of the different types of plagiocephaly based on the age of the children (Chi Square = 3.617; P = .46) (see Table 2).

Table 2. Number of children (divided by age) with different types of plagiocephaly (N = 120).

| Type | < 3 years old (N = 39) | 3-4 years old (N = 33) | >4 years old (N = 48) |
|------|------------------------|------------------------|-----------------------|
| III | 0 | 1 | 3 |
| IV | 1 | 1 | 3 |
| V | 39 | 31 | 42 |

4. Discussion

The main objective of this research was to verify the frequency of nonsynostotic plagiocephaly, also called positional plagiocephaly, in children with ASD.

This survey was an integral part of the neuropsychological assessment of the children in the sample examined. The results showed that in the sample of ASD children, 48% had signs of plagiocephaly, in particular the fronto-occipital form (type III, IV and V of the Argenta classification). About 44% had Type V, which is plagiocephaly with posterior cranial asymmetry, ear malposition as well as forehead and face asymmetry (with temporal protrusion and / or occipitoparietal anomaly).

The incidence of positional plagiocephaly before the 1992 "Back to Sleep" campaign of the American Academy of Pediatrics (AAP) for the prevention of sudden infant death syndrome (SIDS), was about 1/300 live births (0.33%); following the recommendations of the AAP, the incidence has been reached between 1/68 and 1/72 live births [33]. Current prevalence rates are higher, ranging between 8.2% and 48% of newborns [14, 34, 35]. These data indicate that the percentages observed in the sample of children with ASD of the present research (48%) are completely comparable to those found in typically developing children.

In recent years, osteopathic therapy has also assumed a key role in the treatment of cranial malposition, which contributes to the optimization of vertebral alignment and mobility of the head and neck with normalization of the skull base, intraosseous sutures and strains (abnormal ligament tension).

There are no data relating to the use of osteopathic observation and therapy techniques for plagiocephaly in the population with ASD, also because of the age of diagnosis compared to the onset of plagiocephaly. However, in consideration of the number of ASD children with positional plagiocephaly, comparable to that of the general population, it seems important to reflect on the possible implications that this condition could have on the psychophysical well-being of children with ASD. This seems even more valid if we consider two elements: 1. ASD children have greater difficulty, if not impossibility, to verbally express their discomfort and even physical discomfort, therefore it is up to professionals (as well as parents) to find a way to identify states of dysfunction and / or structural conditions that could also negatively interfere with behavioral expressiveness. 2. There are some studies and researches that correlate postural and motor asymmetry with ASD, which for some scientists such as Gallese would explain the dyspractic origin of some forms of ASD [36]. Consequently, we believe that osteopathic observation can give a great contribution within the multidisciplinary team, both in the assessment and in the therapeutic planning. Particularly in the first years of life, when the child learns mainly from sensory-perceptive-motor experiences and in ASD children where atypical sensory and motor asymmetries often contribute to the structuring of dysfunctional behaviors.

Regarding the age of children, there is now a wide international literature that underlines the importance of osteopathic intervention in the neonatal period, which highlights the effectiveness of osteopathic treatment in the presence of symptomatic and idiopathic asymmetries in the first months of life [37, 38]. In this research, children have been involved from the age of 18 months, the age in which the first signs and symptoms of autism are usually observed, so intervening through osteopathic treatment in the first months of life means to be able to prevent the onset of dysfunctions (not related to autism) and their consequences; furthermore, this treatment could favor the development of other areas of functional regulation of the child, for example those related to sleep and feeding, reducing the tension and / or dysfunctional states already present, so continuing the prevention of further dysfunctions.

Specifically, working on the structural blocks and / or perceptual-motor dysfunctions of the oral district means making the child more responsive to therapy and reducing the discomfort he feels, especially in the moments of feeding and sleep, which represent two fundamental areas of physiological regulation. In fact, there are evidences of effective osteopathic interventions in subjects with malocclusion [39], facial [40] and postural asymmetries [41].

Another important correlation is that between auditory attention, typically impaired in children with ASD, and dysfunctions of the auditory system, another area in which there is evidence of the efficacy of osteopathic intervention [12]. Often, as occurs in the first years of life, children produce a lot of mucus and phlegm, which tend to stagnate in the ear canals due to drainage problems related to structural factors. In these cases, osteopathic techniques are highly effective in allowing better drainage, promoting better breathing and auditory processing, as well as greater well-being.

5. Conclusion

Plagiocephaly is a craniofacial dimorphism that does not resolve spontaneously, it evolves with bone growth. The results of this research lead to an important reflection in clinically re-evaluating plagiocephaly within a neonatal assessment of the very first months of life. This observational study highlights not only the high incidence of plagiocephaly even in children with ASD, but above all the degree of severity; the sample under examination does not fall within the age group in which it is possible to model the shape, and none of the children examined received osteopathic or other treatments to resolve plagiocephaly. The fact that the percentage of detected cases is comparable to that of the general population, underlines the need, as happens for children with typical development, to intervene early especially with children with ASD. In typically developing peers, there is numerous evidence of the benefits associated with osteopathic treatment in the presence of somatic dysfunctions; if we consider how much these are related to sensory, perceptual and motor alterations, it is clear that in

children with an already altered profile, these can amplify dysfunctional behaviors and states of discomfort related to autism. It therefore seems important to us to guarantee children with ASD a global care, which does not neglect these aspects within a multidimensional assessment and an integrated therapeutic / care project.

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Case Report

The Contribution of Osteopathy in the DERBBI Project For Autism. Case Report

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- Children
- Multidisciplinary intervention

Abstract

In this report we will discuss how the osteopathic approach can support therapeutic intervention with children with Autism Spectrum Disorder. The osteopathic intervention precedes other interventions because it modifies the child's body structure and reduces some sensory disorders which often heavily aggravate the symptomatology. It is important to point out that the palpatory osteopathic evaluation of subjects with ASD differs from that of typically developing children. Since the "osteopathic rationale" adapts to the complexity of the disorder, it is not always possible to follow the palpatory diagnosis-treatment-retest scheme, and great flexibility is required on the part of the osteopath. Two children will receive the same diagnosis of ASD despite having different somatic and sensory characteristics, so the osteopathic treatment will never be standardized but on the contrary absolutely individualized.

In this Case Report will be discussed the case of a child with ASD of 4 years and 10 months, included in an multidisciplinary therapeutic project, which also included assessment and osteopathic intervention.

OSSERVARE IL BAMBINO NELLA COMPLESSITA'

GIOCO

RISPECCHIARE IL BAMBINO ATTRAVERSO LA
DIMENSIONE LUDICA PER CREARE UN PONTE CHE VINCA
LA NORMALE RESISTENZA INIZIALE

SPAZIO

OSSERVARE LA GESTIONE DELLO SPAZIO CIRCOSTANTE
E QUELLA DELLA PROPRIA PERSONA POICHE' POSSONO
RIFLETTERE UN VISSUTO SPIACEVOLE AL MOMENTO DEL
PARTO ACCOMPAGNATO DA UNA SPIACEVOLE
EMOZIONE ATTRAVERSO CUI IL BAMBINO FILTRA IL
PERCEPITO ESTERNO

CORPO

MOTRICITA' GLOBALE E FINE. COORDINAZIONE .
POSTURA NELLA STATICA E DURANTE LA DINAMICA.
ZONE CORPOREE DI STRAIN.
TEST PALPATORI OMT

OMT

- ASCOLTARE LE ESIGENZE DEL CORPO
- **ESSERE PRESENTI**
- COMPRENDERE LA DIFFICOLTA' DEL BAMBINO INTEGRANDO LA DIAGNOSI OSTEOPATICA CON QUELLA DI ALTRE FIGURE PROFESSIONALI
- GESTIRE IL TOCCO, L'INTENSITA', LA DURATA, LA QUANTITA' DI ZONE DA TRATTARE

OMT

- L'INTENSITA' DEL TOCCO VARIA IN BASE A MOLTISSIMI PARAMETRI AVENDO UN DUPLICE EFFETTO: PROMUOVERE UNA RISPOSTA TISSUTALE, ACQUISIRE INFORMAZIONI
- LA DURATA DELL'OMT E' UN PARAMETRO PER MONITORARE IL TEMPO DI ATTENZIONE DEL BAMBINO
- TOCCARE POCHE ZONE, QUELLE CONSENTITE DAL BAMBINO PERCHE' SONO PORTE DI INGRESSO
- **MAI** IPOTIZZARE LA DISFUNZIONE!!!!



Effect of Continuous Touch on Brain Functional Connectivity Is Modified by the Operator's Tactile Attention

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Touch has been always regarded as a powerful communication channel playing a key role in governing our emotional wellbeing and possibly perception of self. Several studies demonstrated that the stimulation of C-tactile afferent fibers, essential neuroanatomical elements of affective touch, activates specific brain areas and the activation pattern is influenced by subject's attention. However, no research has investigated how the cognitive status of who is administering the touch produces changes in brain functional connectivity of touched subjects. In this functional magnetic resonance imaging (fMRI) study, we investigated brain connectivity while subjects were receiving a static touch by an operator engaged in either a tactile attention or auditory attention task. This randomized-controlled single-blind study enrolled 40 healthy right-handed adults and randomly assigned to either the operator tactile attention (OTA) or the operator auditory attention (OAA) group. During the five fMRI resting-state runs, the touch was delivered while the operator focused his attention either: (i) on the tactile perception from his hands (OTA group); or (ii) on a repeated auditory stimulus (OAA group). Functional connectivity analysis revealed that prolonged sustained static touch applied by an operator engaged with focused tactile attention produced a significant increase of anticorrelation between posterior cingulate cortex (PCC)-sensory and right insula (INS) as well as right inferior-frontal gyrus but these functional connectivity changes are markedly different only after 15 min of touching across the OTA and OAA conditions. Interestingly, data also showed anticorrelation between PCC and left INS with a distinct pattern over time. Indeed, the PCC-left INS anticorrelation is showed to start and end earlier compared to that of PCC-right INS. Taken together, the results of this study showed that if a particular cognitive status of the operator is sustained over time, it is able to elicit significant effects on the subjects' functional connectivity patterns involving cortical areas processing the interoceptive and attentional value of touch.

Keywords: affective touch, interoceptive modulation, tactile stimuli, fMRI, insula

INTRODUCTION

Touch is a critical communication channel across filopodia. The sense of touch is divided into two major categories: proprioceptive and interoceptive (affective), activated by distinct mechanisms with cerebral correlates in somatosensory and insular cortex, respectively (Sokolov et al., 2002; Struhschne et al., 2012).

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Interoception and Touch

As far as the interoceptive aspect is concerned, the insula is known to be part of the interoceptive/salience neural network (Yarkoni et al., 2011); it integrates information from multiple brain regions, processing sensations ranging from physiologically driven motivational states to emotional awareness to somatosensory stimuli, including touch, which serves to maintain interoceptive homeostasis (Craig, 2002, 2009; Critchley et al., 2004; McGlone et al., 2014). Insula has reciprocal connections with the nPCC (Leech et al., 2012; Khalsa et al., 2014) exhibiting negative functional correlations mainly related to the allocation of task-positive or task-negative attentional resources based on interoceptive information (Fox et al., 2005; Uddin et al., 2009; Leech et al., 2012; Leech and Sharp, 2014).

Considering the insular effect during touch, it was demonstrated that the insular cortex is active in subjects receiving the touch—through a bottom-up process—(McGlone et al., 2014), with an insular somatotopic organization of CT-afferent fibers (McGlone et al., 2017). In addition, other research showed a top-down cognitive modulation of affective touch, demonstrating that subjects can cognitively modulate their response to the received touch during the “rubrich-rubth” task (McCabe et al., 2008). These were further confirmed by a Rolls (2008) review that pointed out how different cognitive tasks, performed by subject, can modulate the effect of C-tactile afferent fibers. Interestingly, static touch seems to elicit similar but attenuate interoceptive effects in the insular cortex (Bolanowski et al., 2004; Ackerley et al., 2012). Notwithstanding these findings, studies considering the effects of the OTA status on the brain correlates of subjects receiving the touch are still lacking.

In this regard, our study showed that the anticorrelation between PCC, a central hub for the DMN and the insula, an important node of the salience network (SN; De Havas et al., 2012), is increased after prolonged static touch delivered by an operator engaged in a focused tactile attention task. Int



OMT E PLASTICITA' CORTICALE

BRIEF REPORT

1

Osteopathic Manipulative Therapy Potentiates Motor Cortical Plasticity

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October 10, 2017.

Context: Osteopathic manipulative therapy (OMT), manipulative care provided by foreign-trained osteopaths is effective in managing pain caused by a variety of clinical conditions. Nevertheless, the physiologic mechanisms at the basis of the clinical improvement are poorly understood.

Objective: To investigate the effects of OMTs, muscle stretching, and soft touch interventions on motor cortical excitability through a rapid-rate paired associative stimulation (PAS) protocol.

Methods: In this crossover study, participants underwent OMTs, muscle stretching, and soft touch interventions. A rapid-rate PAS transcranial magnetic stimulation protocol was performed immediately after each intervention session, which consisted of 600 pairs of stimuli continuously delivered to the left primary motor cortex and to the right median nerve at a rate of 5 Hz for 2 minutes. The interstimulus intervals between the peripheral stimulus and the transcranial magnetic stimulation was set at 25 milliseconds. Before and after rapid-rate PAS (immediately after and 15 minutes after), changes in the amplitude of the motor evoked potentials were measured in the right abductor pollicis brevis and the right first dorsal interosseus.

Results: Of the potential 15 participants initially recruited, 12 fit the inclusion criteria. Two of the 12 participants were excluded from the final analysis because of excessive artifact movements. Rapid-rate PAS induced a more pronounced, longer-lasting increase in cortical excitability in the abductor pollicis brevis muscle in patients 15 minutes after the OMTs intervention than after the muscle stretching or sham interventions ($P < .016$).

Conclusion: Results of the current study provide support for the effects of OMTs on cortical plasticity.

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doi:10.7556/jaoa.2018.084

Keywords: motor evoked potential; osteopathic manipulative therapy; transcranial magnetic stimulation

Conclusion

In a group of asymptomatic volunteers who had somatic dysfunction, differences in the increase of motor cortex excitability after OMTh, muscle stretching, and soft touch interventions were observed. Osteopathic manipulative therapy was able to induce relevant neurophysiologic effects in terms of cortical plasticity more effectively than sham interventions. The clinical importance of this finding is still unclear. Therefore, further study of different disease states with larger populations is needed.

References

1. Franke H, Franke JD, Fryer G. Osteopathic manipulative treatment for nonspecific low back pain: a systematic review and meta-analysis. *BMC Musculoskelet Disord*. 2014;15:286. doi:10.1186/1471-2474-15-286

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OBIETTIVI DELL'OMT

- FAVORIRE LA SALUTE
- INQUADRARE IL BAMBINO NELLA COMPLESSITA'
- SCEGLIERE ACCURATAMENTE LE TECNICHE
- METTERSI IN ASCOLTO
- ESSERE PRESENTI-CENTRATI

HEALTH CONDITIONS

- **DISEASES OF THE CIRCULATORY SYSTEM AMONG ADULT PEOPLE DIAGNOSED WITH INFANTILE AUTISM AS CHILDREN: A LONGITUDINAL CASE CONTROL STUDY**
- Author links open overlay panel [Svend Erik Mouridsen^a](#)
- [Bente Rich^{b1}](#) [Torbensager^c](#)
- <https://doi.org/10.1016/j.ridd.2016.07.002> [Get rights and content](#)
- **Highlights**
- Knowledge of health conditions in adults with autism spectrum disorders is scarce.
- In this case control study we describe, for the first time, systematically diseases relating to the circulatory system in adults with infantile autism, based on a nationwide hospital register.
- Ischemic heart diseases occurred significantly more frequently among people in the comparison group.
- Monitoring of health conditions is essential in adults with infantile autism.
- **Abstract**
- **Background**
- Research dealing with adult people with autism spectrum disorders (ASD) noticeably lags behind studies of children and young individuals with ASD.
- **Aims**
- The objective of this study was to compare the prevalence and types of diseases of the circulatory system in a clinical sample of 118 adult people diagnosed with infantile autism (IA) as children with 336 sex and age matched controls from the general population.
- **Methods and procedures**
- All participants were screened through the nationwide Danish National Hospital Register. The average observation time of both groups was 37.2 years, and mean age at follow-up was 49.6 years.
- **Outcomes and results**
- Of the 118 people with IA, 11 (9.3%) were registered with at least one disease of the circulatory system against 54 (16.1%) in the comparison group ($p = 0.09$; OR = 0.54; 95% CI 0.3–1.2). Ischemic heart diseases occurred significantly more frequently among people in the comparison group ($p = 0.02$).
- **Conclusions and implications**
- **IT IS ARGUED THAT DISEASES OF THE CIRCULATORY SYSTEM MAY BE UNDERDIAGNOSED IN PEOPLE WITH IA BECAUSE OF THE DIFFICULTIES THEY FACE WITH RESPECT TO IDENTIFYING AND COMMUNICATING SYMPTOMS OF ILL HEALTH. BEARING IN MIND THAT CARDIOVASCULAR DISEASE IS THE PRIMARY CAUSE OF DEATH IN MOST DEVELOPED COUNTRIES, IT IS SUGGESTED THAT TO PREVENT DISEASE AND MANAGE HEALTH CONDITIONS, HEALTH MONITORING IS ESSENTIAL IN ADULT PEOPLE WITH IA.**

Di Renzo M., “The Theoretical Principles of the Body-Centered Therapy to Promote Affective Attunement in Children with Autism Spectrum Disorder”,

Journal of Behavioral and Brain Science, 2017, 7, 12, pp. 545-556.

Seguendo i nuovi paradigmi della conoscenza descritti secondo un processo bottom-up, le radici dei disturbi dello Spettro Autistico vanno ricercate nei primi meccanismi di sintonizzazione tra madre e bambino che consentono un primo livello di mentalizzazione, le attuali teorie evolutive e le neuroscienze hanno confermato l'esistenza di quei meccanismi difensivi a carico della corporeità e dell'affettività che le teorie psico dinamiche avevano già evidenziato. La lettura del comportamento del bambino non solo tramite valutazioni testistiche ma anche attraverso attente osservazioni cliniche consente una comprensione migliore delle difficoltà comunicative e relazionali presenti nell'autismo ma, soprattutto favorisce la ricerca di quell'area di sviluppo prossimale dove può collocarsi l'intervento terapeutico rispettoso dell'individualità del singolo bambino e della specificità delle vicende relazionali con il mondo. Nell'articolo vengono presentati i principi teorici di una terapia centrata sul corpo per promuovere, nei bambini autistici, i meccanismi di sintonizzazione necessari per attivare le risorse cognitive presenti.

Di Renzo M., Bianchi di Castelbianco F., Vanadia E., Petrillo M., Racinaro L., Rea M.,
“T.U.L.I.P. Protocol (TCE, UOI, Leiter-R as Indicators of Predictivity) for the Assessment
of the Developmental Potential in Children with Autism Spectrum Disorders”,
Autism - Open Access, 2016, 6, 4 (188), pp. 1-7.

L'articolo si propone l'obiettivo di evidenziare alcuni indici predittivi di un miglioramento nei punteggi ADOS in un gruppo di 49 Bambini con Disturbi dello Spettro Autistico. A questo scopo è stato ideato il protocollo T.U.L.I.P. che, utilizzando come indicatori di predittività il Ragionamento Fluido all'interno della Leiter-R, la presenza di Contagio Emotivo (TCE) e la capacità comprendere le altrui intenzioni (UOI), consente di individuare una categoria di bambini autistici che risponde positivamente al trattamento e migliora la sintomatologia autistica. I bambini che presentavano indici predittivi UOI e TCE Emergenti e Presenti all'intake hanno cambiato diagnosi ADOS dopo 4 anni di terapia e alcuni (quelli in cui gli indici erano Presenti) hanno ottenuto un punteggio che li colloca nella categoria Non Autismo. Nei bambini in età prescolare, o nel primo anno di scolarizzazione, la valutazione delle componenti cognitive e relazionali evidenzia che le competenze relazionali hanno una maggiore rilevanza nel predire l'abbassamento dei punteggi ADOS. La presenza di indici predittivi soprattutto sulla risposta emotiva e sulla capacità di comprendere le altrui intenzioni consente inoltre di lavorare attraverso un approccio evolutivo relazionale che attive le potenzialità presenti per ottenere miglioramenti anche sul piano cognitivo. La componente Affetto/Sociale dell'ADOS correla con gli indici predittivi e rende ragione di un intervento mirato alla dimensione affettiva.

Di Renzo M., Bianchi di Castelbianco F., Petrillo M., Racinaro L., Donaera F., Rea M.,

“The emotional contagion in children with Autism Spectrum Disorder”,

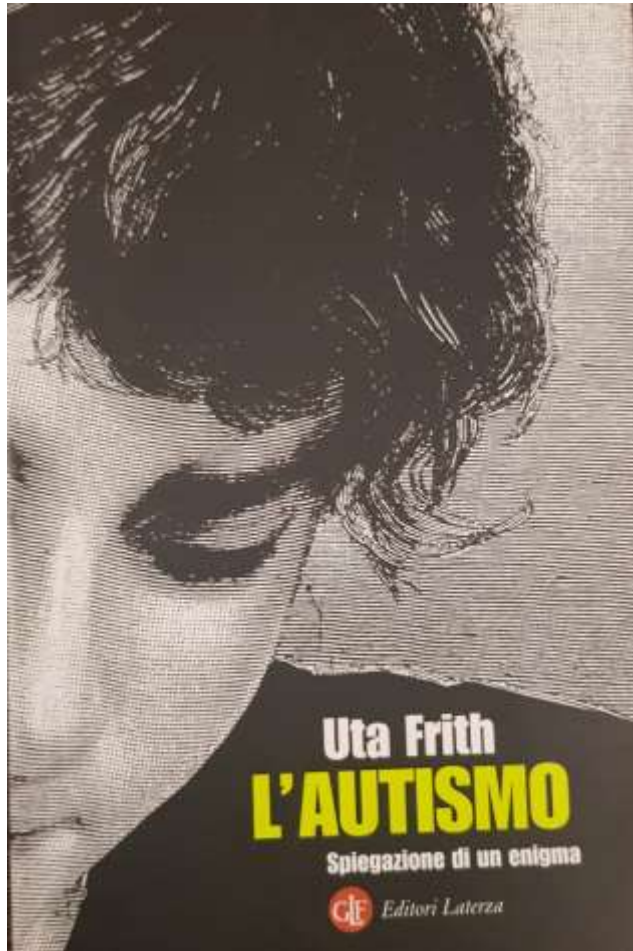
Austin Journal of Autism & Related Disabilities, 2016, 2, 2:1020, pp. 1-7.

Studi dell'ultimo decennio dimostrano che nei bambini con autismo, oltre alle difficoltà nelle aree linguistiche, sociali e relazionali, sia presente una compromissione dei meccanismi di simulazione incarnata, ossia di quei comportamenti imitativi del corpo che consentono di dare un contenuto esperienziale alle emozioni proprie e altrui (Gallese, 2006). Rintracciare questa tipologia di risposta emozionale che i bambini con autismo siano in grado di mettere in atto, definibile anche come contagio emotivo, permette di spostare il focus terapeutico dalla riduzione delle espressioni sintomatiche comportamentali del bambino, alla promozione dell'espressione delle sue capacità di regolazione emotiva. Obiettivo di questo studio è stato indagare la presenza di contagio emotivo in 53 bambini con autismo di età compresa tra i 22 e i 66 mesi, attraverso il Test di Contagio Emotivo (Di Renzo & Stinà, 2011) e verificare le aree di contagio emotivo più o meno compromesse. È emerso che la gravità del disturbo è strettamente correlata all'incapacità del bambino di rispondere agli stimoli emotivi, che la risposta emotiva è indipendente dalla capacità cognitiva ma è correlata alla gravità del disturbo e che l'emozione a cui rispondono maggiormente i bambini è la felicità, mentre quella a cui rispondono meno è la rabbia

Di Renzo M., Bianchi di Castelbianco F., Petrillo M., Racinaro L., Donaera F., Rea M.,
“The emotional contagion in children with Autism Spectrum Disorder”,
Austin Journal of Autism & Related Disabilities, 2016, 2, 2:1020, pp. 1-7.

I risultati della nostra ricerca, in conclusione, confermano che “le abilità intellettive, relazionali ed emozionali, nonché il benessere dei bambini autistici possono essere migliorati da una varietà di attività non verbali, non cognitive in cui il terapeuta che sensibilmente si relaziona all’individualità dei loro impulsi ed esperienze sentite accompagna il bambino autistico verso emozioni di intimo coinvolgimento verso uno stato più produttivo e meno difensivo di attività e di consapevolezza. Questo tipo di terapia relazionale e creativa, che risponde e guida le azioni primarie, gli interessi e i sentimenti dei bambini autistici, tanto quanto la madre si impegna con il suo affetto ed il suo bambino sin dalla nascita, può andare a beneficio del linguaggio come anche della educazione pratica e sociale” (Malloch and Trevarthen, 2009; Stern 2010). Avvalora questa considerazione il fatto che il maggior numero di risposte riguarda lo stimolo-emozione della “felicità” nei tre gruppi considerati. **Sul piano clinico questo si traduce nella necessità di offrire al bambino situazioni motivanti e coinvolgenti in una condizione giocosa e assolutamente non stressanti da parte dei care-giver.**

UTA FRITH



- **TEMPORAL LOBE DYSFUNCTION IN CHILDHOOD AUTISM: A PET STUDY. POSITRON EMISSION TOMOGRAPHY.**
- 1. Am J Psychiatry. 2000 Dec;157(12):1988-93 Zilbovicius M(1), Boddaert N, Belin P, Poline JB, Remy P, Mangin JF, Thivard L, Barthélémy C, Samson Y. Author information: (1)Service Hospitalier Frédéric Joliot, Direction des Sciences du Vivant, Département de Recherche, Commissariat à l'Energie Atomique, Tours, France.zilbo@shfj.cea.fr
- **OBJECTIVE:** The nature of the underlying brain dysfunction of childhood autism, a life-long severe developmental disorder, is not well understood. Although researchers using functional brain imaging have attempted to contribute to this debate, previous studies have failed to report consistent localized neocortical brain dysfunction. The authors reasoned that early methods may have been insensitive to such dysfunction, which may now be detectable with improved technology.
- **METHOD:** To test this hypothesis, regional cerebral blood flow was measured with positron emission tomography (PET) in 21 children with primary autism and in 10 nonautistic children with idiopathic mental retardation. Autistic and comparison groups were similar in average age and developmental quotients. The authors first searched for focal brain dysfunction in the autistic group by using a voxel-based whole brain analysis and then assessed the sensitivity of the method to detect the abnormality in individual children. An extension study was then performed in an additional group of 12 autistic children.
- **RESULTS:** The first autistic group had a highly significant hypoperfusion in both temporal lobes centered in associative auditory and adjacent multimodal cortex, which was detected in 76% of autistic children. Virtually identical results were found in the second autistic group in the extension study.
- **CONCLUSIONS:** PET and voxel-based image analysis revealed a localized dysfunction of the temporal lobes in school-aged children with idiopathic autism. Further studies will clarify the relationships between these temporal abnormalities and the perceptive, cognitive, and emotional developmental abnormalities characteristic of this disorder. DOI: 10.1176/appi.ajp.157.12.1988 PMID: 11097965 [Indexed for MEDLINE]

MENINGEAL/VASCULAR ALTERATIONS AND LOSS OF EXTRACELLULAR MATRIX IN THE NEUROGENIC ZONE OF ADULT BTBR T+ TF/J MICE, ANIMAL MODEL FOR AUTISM

- [Neurosci Lett.](#) 2011 Jul 12;498(3):173-8. doi: 10.1016/j.neulet.2011.05.014. Epub 2011 May 11.
- .
- [Mercier F¹](#), [Cho Kwon Y](#), [Kodama R](#).
- [Author information](#)
- **Abstract**
- Autism spectrum disorders are characterized by impaired social and communication skills and seem to result from altered neural development. We sought to determine whether the anatomy of the meninges and extracellular matrix (ECM) is altered in an animal model of autism, the BTBR T+ tf/J mouse. This mouse displays white matter tract anatomical defects and exhibits several symptoms of autism. Immunofluorescence cytochemistry for laminin, a major ECM marker, was performed on series of coronal sections of the adult BTBR T+ tf/J brain and the anatomy was analyzed in comparison to B6 wild type mice. Laminin immunoreactivity visualized meninges, blood vessels and the subventricular zone (SVZ) stem cell-associated ECM structures, which I have named fractones. All BTBR T+ tf/J mice observed showed the same forebrain defects. The lateral ventricle volume was severely reduced, the falx cerebri elongated, the arteries enlarged and the choroid plexus atrophied. Compared to B6 mice, fractone numbers in BTBR T+ tf/J mice were reduced by a factor three in the SVZ of the anterior portion of the lateral ventricle. This represents the primary neurogenic zone during adulthood. Fractones were reduced by a factor 1.5 in posterior portions of the lateral ventricle. Moreover, fractone size was reduced throughout the lateral ventricle SVZ. These results show hitherto unsuspected alterations in connective tissue/vasculature and associated ECM in the adult BTBR T+ tf/J mouse. The drastic changes of the connective tissue and ECM in the neurogenic zone of the lateral ventricle may contribute to incorrect neurogenesis during developmental and adult stages.
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- PMID: 21600960 DOI: [10.1016/j.neulet.2011.05.014](#)

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An Osteopathic Approach to Autism

Effects of Osteopathic treatment on the gastrointestinal system function of Autistic Children

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King's College Hospital NHS Foundation Trust

The National Autistic Society

Conclusion

Analysis of individual parameters showed significant changes in three of the twenty four parameters tested: 'vomiting' 'poor appetite' and 'lack of eye contact'.

The parameters 'need for a fixed routine' and 'constipation' appear to indicate that they are independent predictors of gastrointestinal inflammation in autistic children.

These results suggest that these two parameters could be used in a standardized questionnaire as predictors of inflammatory processes in autistic children aged betw **143**
3 ½ and 8 years.

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GRAZIE



**"Conosci la tua anatomia
e la tua fisiologia,
ma quando metti le mani
sul corpo di un paziente,
non dimenticarti che
vi abita un'anima vivente"**

A. T. Still