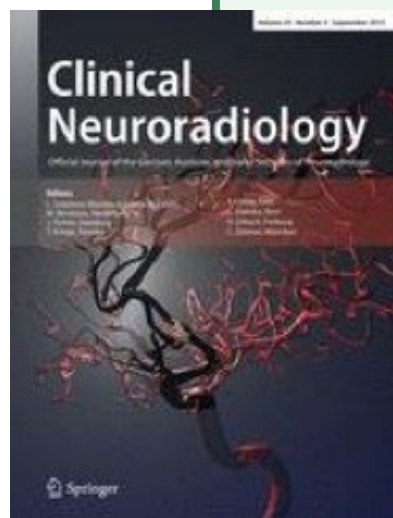


# Neuropädiatrie im Vogelflug Varia

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Pädiatrische Neurologie, LMU Klinikum

48. Jahrestagung der GNP, Dortmund, 18.11.2023



## Mechanical Thrombectomy for Pediatric Large Vessel Occlusions A Systematic Review and Meta-analysis

C Bilgin · M Ibrahim · A Y Azzam · S Ghazy · A Elswedy · H Kobeissi · M S Jabal · R Kadirvel · G Boulouis · O Naggara · J Fiehler · M Psychogios · S Lee · M Wildgruber · A Kemmling · F Al-Mufti · M Kossorotoff · P · D F Kallmes

Clin Neuroradiol (2023) 33:635–644

# Mechanical Thrombectomy for Pediatric Large Vessel Occlusions A Systematic Review and Meta-analysis

- Fragestellung: Sicherheit und Wirksamkeit der mechanischen Thrombektomie bei Großgefäßverschluss
- Metaanalyse: 11 Studien, 215 Patienten

# Mechanical Thrombectomy for Pediatric Large Vessel Occlusions A Systematic Review and Meta-analysis

**Table 1** Characteristics of the studies included within quantitative synthesis

Study, year, country	Study characteristics		Study population			Outcome assessment criteria	
	Study design	Study focus	Sample size	Age, years <sup>a</sup>	Female/male	Recanalization	Functional outcome
Fragata et al., 2021, Portugal [17]	Single center, retrospective	Pediatric MT	7	13, (2–17)	5/2	mTICI	mRS at 90 days
Bhatti et al., 2019, India [18]	Single center, retrospective	Pediatric MT	5	13, (6–17)	0/5	mTICI	mRS at 90 days
Shoirah et al., 2019, USA [19]	Multicenter, retrospective	Pediatric MT	19	10.9±6	7/12	mTICI	mRS at 90 days
Bigi et al., 2018, Switzerland [20]	Multicenter, retrospective	IVT and MT in pediatric LVOs	5	12.4±4	Gender data were not available for MT group	Not specified	PSOM
Bhatia et al., 2022, International [21]	Multicenter, retrospective	IVT and MT in pediatric LVOs	13	12.4±4	3/10	Not reported	Pediatric mRS at 90 days
Ravindra et al., 2020, USA [22]	Multicenter, retrospective	Pediatric MT	23 <sup>c</sup>	11.6±4	11/10	mTICI	mRS at 90 days
Bhogal et al., 2021, International [23]	Multicenter, retrospective	Pediatric MT	5	15 (7–17)	3/2	TICI	mRS at discharge
Spoms et al., 2020, International [26]	Multicenter, retrospective	Pediatric MT	73	11.3 (7–15)	36/37	mTICI	PSOM and mRS at discharge, 6 and 24 months <sup>b</sup>
van Es et al., 2021, Netherlands [24]	Multicenter, prospective	Pediatric MT	9	14 (13 months–17 years)	4/5	mTICI	mRS at 6 months
Zhou et al., 2019, China [25]	Multicenter, retrospective	Pediatric MT	7	12 (7–14)	2/5	mTICI	mRS at 90 days
Kossorotoff et al., 2022, France [27]	Multicenter, retrospective	Pediatric MT	40	9.8±5.9	15/25	mTICI	mRS at 90 days

# Mechanical Thrombectomy for Pediatric Large Vessel Occlusions A Systematic Review and Meta-analysis

## ■ Ergebnisse:

- Erfolgreiche Rekanalisationsrate 90.3% (95% CI=85.77–95.11%)
- Gutes Outcome (mRS=0–2) 83.3% (95% CI=73.54–94.50%)
- Hervorragendes Outcome (mRS=0–1) 59.5% (95% CI = 44.24–80.06%)
- ICH 0.59% (95% CI = 0–3.30%)
- Mortalitätsrate 3.2% (95% CI = 0.55–7.38%)

## ■ **Schlussfolgerung:** MT wirksam und sicher; jedoch prospektive Studien erforderlich

## ■ **Limitationen:** retrospektive Studien, kleine Kohorten, mittleres Alter in allen Studien >10 Jahre, keine Angaben zur Ätiologie, unterschiedliche outcome Kriterien,...



## High Prevalence of Collagenopathies in Preterm- and Term-Born Children With Periventricular Venous Hemorrhagic Infarction

Norman Ilves, Sander Pajusalu, Tiina Kahre, Rael Laugesaar, Ustina Šamarina, Dagmar Loorits, Pille Kool, and Pilvi Ilves,

Journal of Child Neurology 2023, Vol. 38(6-7) 373-388

# High Prevalence of Collagenopathies in Preterm- and Term-Born Children With Periventricular Venous Hemorrhagic Infarction

	Total (N = 85)	Preterm PVHI (n = 39)	Antenatal PVHI (n = 6)	Presumed antenatal PVI (n = 40)	P value
Pathogenic/likely pathogenic variants, n (%)					
Collagenopathy	7 (8.2)	1 (2.6)	2 (33.3)	4 (10.0)	.043
Other stroke genes	2 (2.4)	1 (2.6)	0 (0)	1 (2.5)	>.99
Coagulopathy, n (%)	2 (2.4)	1 (2.6)	0 (0)	1 (2.5)	>.99
Variants of unknown significance					
Collagenopathy, n (%)	7 (8.2)	4 (10.3)	0 (0)	3 (7.5)	.68
Other variants, n (%)	5 (5.8)	3 (7.7)	0 (0)	2 (5)	.78
Total reported variants	23 (27.1)	10 (25.6)	2 (33.3)	11 (27.5)	

Kollagenopathien: *COL4A1*, *COL4A2*, *COL5A1*

Andere: *NOTCH3*, *MT-TL1*

## High Prevalence of Collagenopathies in Preterm- and Term-Born Children With Periventricular Venous Hemorrhagic Infarction

- Kollagenopathien (n=7): *COL4A1*, *COL4A2*, *COL5A1*
- Signifikant häufiger ausgedehnte bilaterale, multifokale Infarkte
- Schlechteres Outcome bezogen auf Motorik und Epilepsie
  
- Schlussfolgerung: Genetische Testung sollte bei allen Kindern mit PVHI erwogen werden, Fokus auf Kollagenopathien





# Kinderneurologische Untersuchung

## Untersuchungstechnik – klinischer Zugang – Complexity Signature

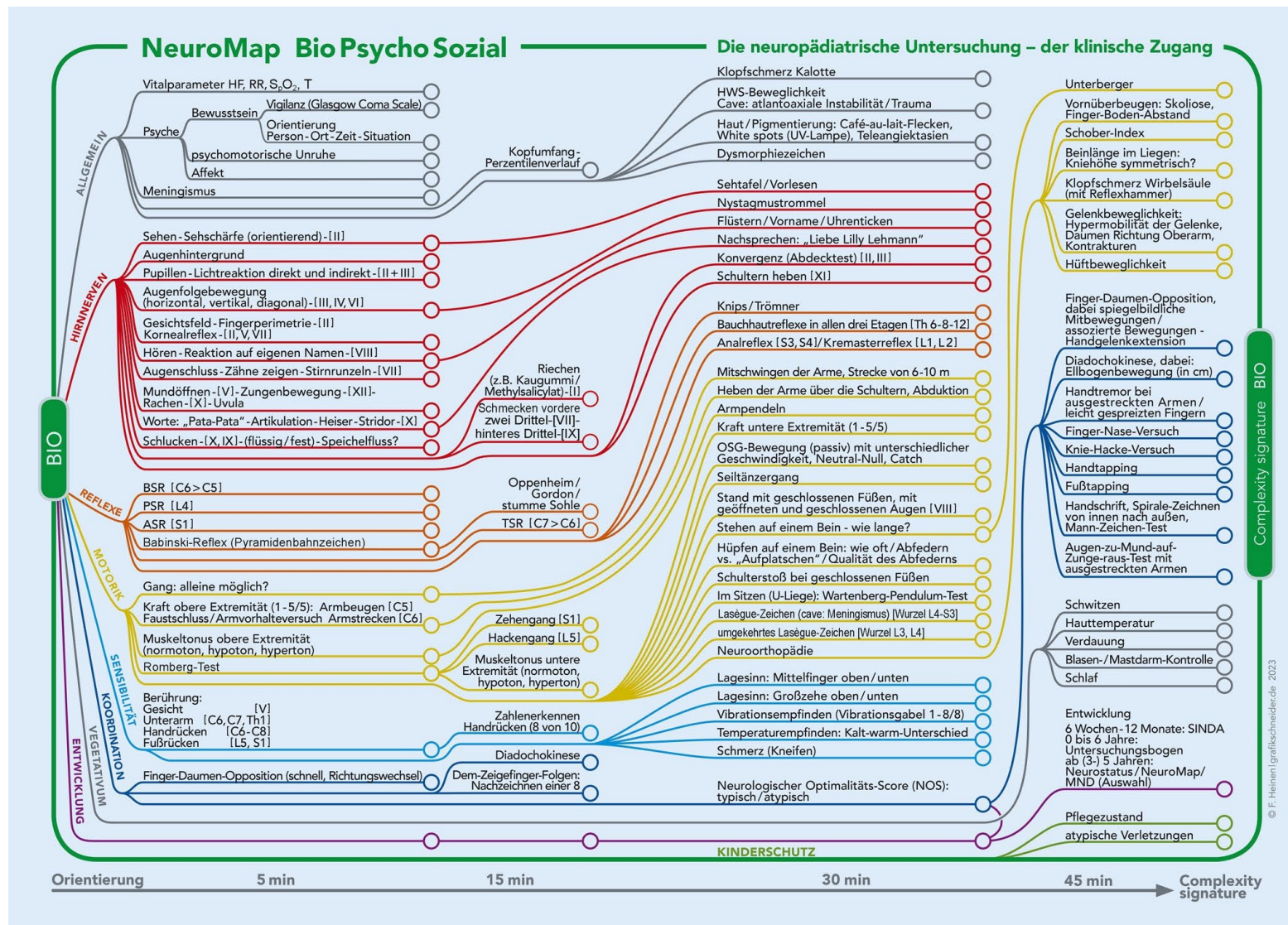
Michaela V. Bonfert · Johanna Wagner · Eva L. Jung · Leonie Grosse · Victoria Lieftüchter · Lucia Gerstl · Florian Heinen

Monatsschr Kinderheilkd  
<https://doi.org/10.1007/s00112-023-01877-6>  
Published online 13 November 2023

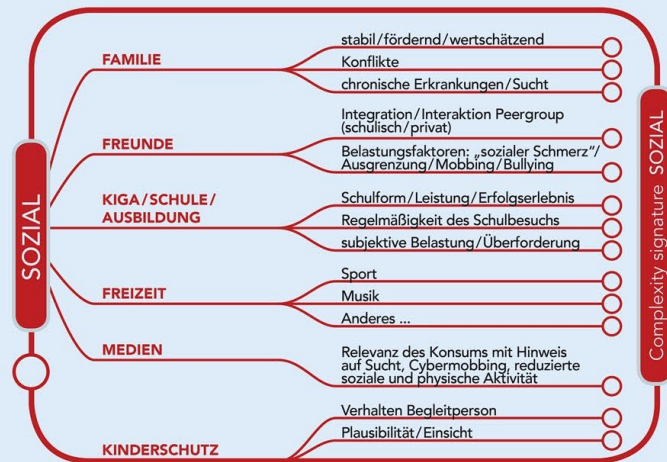
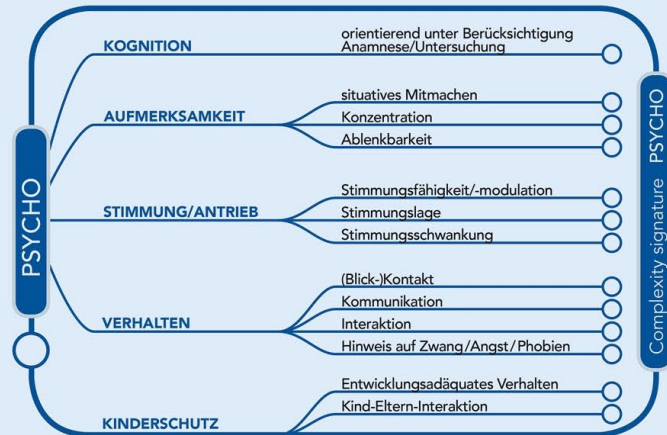
# Kinderneurologische Untersuchung

Untersuchungstechnik – klinischer Zugang – Complexity Signature

- Kinderneurologische Untersuchung als **unverzichtbares Instrument** sowohl der Allgemein- als auch der Neuropädiatrie.
- Die **6 Dimensionen** der neurologischen Untersuchung sind: (1) Hirn- nerven, (2) Reflexe/Muskeleigenreflexe, (3) Motorik, (4) Sensibilität, (5) Koordination, (6) Entwicklung.
- Die **NeuroMap** standardisiert die Untersuchung und Dokumentation und unterstützt eine strukturierte Entscheidungsfindung und Kommunikation.
- Die **Complexity Signature** bildet die Situation des einzelnen Kindes auf den biopsychosozialen Handlungsfeldern ab.



Orientierung 5 min 15 min 30-45 min



Orientierung 5 min 15 min 30-45 min

## Complexity Signature

**BioPsychoSozial** Bitte entscheiden Sie zwischen 😊 positiv bis 😞 negativ.

Die Complexity Signature dient – basierend auf dem biopsychosozialen Modell – der fachlich-intuitiven, selbstuntersuchten (!), subjektiv-klinischen Einschätzung der Komplexität der Erkrankung und der Gesamtsituation eines Kindes. Die Complexity Signature kann zur individuellen Verlaufsbeurteilung für jedes einzelne Kind und zur interdisziplinären Kommunikation eingesetzt werden.

### DIAGNOSEN:

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_

**SCHWEREGRAD**  
... der Erkrankung

😊 😊 😐 😞 😞

**BIO**

- Motorik / MND / GMFCS
- Sinnesfunktionen
- Sprache / Kommunikation
- Vegetativum
- Entwicklung insgesamt

😊 😊 😐 😞 😞

**PSYCHO**

- Kognition
- Aufmerksamkeit
- Stimmung / Antrieb
- Verhalten
- Exekutivfunktion

😊 😊 😐 😞 😞

**SOZIAL**

- Familie
- Freunde
- KiGa / Schule / Ausbildung
- Freizeit
- Alltagskompetenz

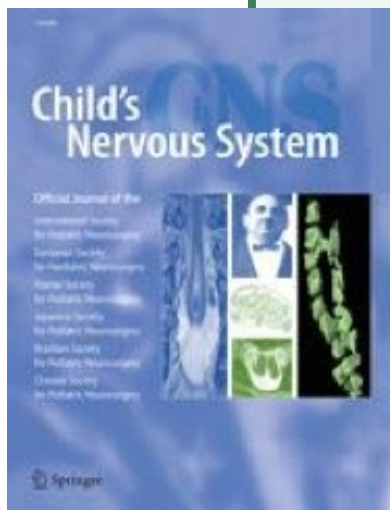
😊 😊 😐 😞 😞

**RESILIENZ**  
Testung / Psychologie / funktionelle Therapien / ...

😊 😊 😐 😞 😞

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# Transorbital point-of-care ultrasound versus fundoscopic papilledema to support treatment indication for potentially elevated intracranial pressure in children

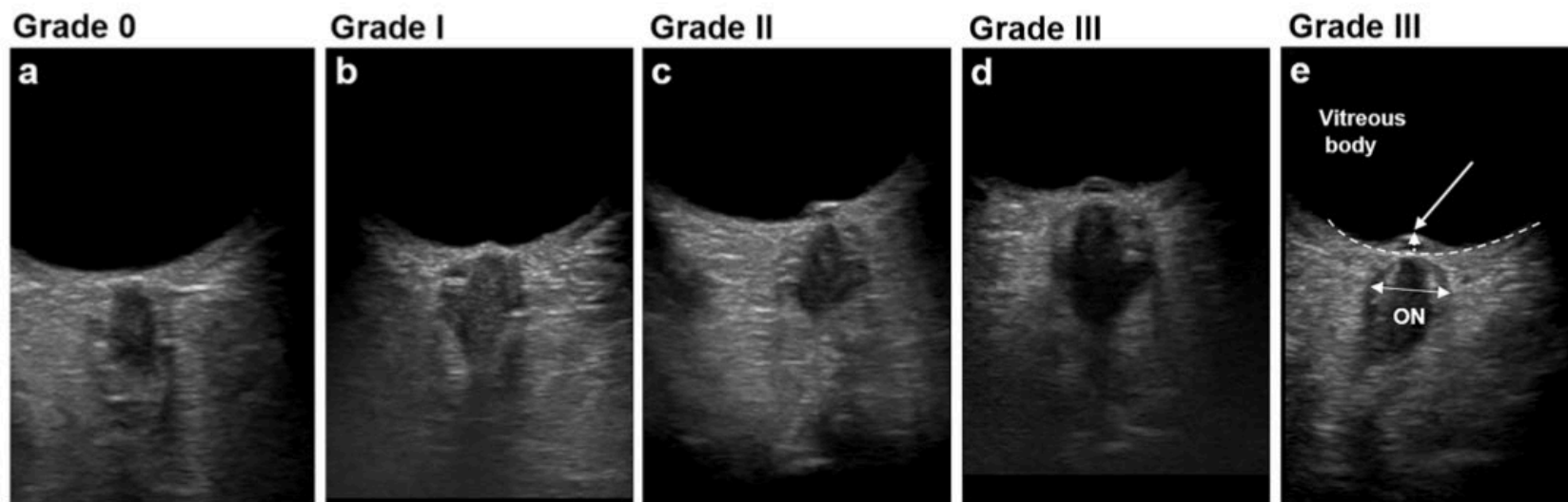
Susanne Regina Kerscher · Julian Zipfel · Karin Haas-Lude · Andrea Bevot · Jonas Teller mann · Martin Ulrich Schuhmann

Child's Nervous System  
<https://doi.org/10.1007/s00381-023-06186-7>  
Published online 14 November 2023

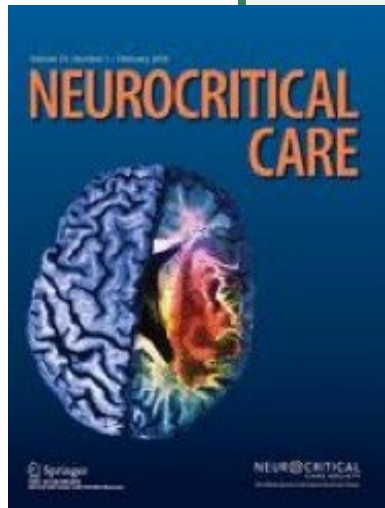
## Transorbital point-of-care ultrasound versus fundoscopic papilledema to support treatment indication for potentially elevated intracranial pressure in children

- 40-60% der Kinder mit erhöhtem ICP ohne Stauungspapille
- Ultraschalldiagnostik (Durchmesser Optikusscheide (**US-ONSD**), Papillenelevation (**US-ODE**)) und **Fundoskopie** bei 72 symptomatischen Kindern (9Mo-18 Jahre)
- US-ONSD und US-ODE zuverlässiger in der Erkennung eines möglicherweise behandlungsbedürftigen intrakraniellen Druckes als die Fundoskopie
- Cut off value für erhöhten ICP mit mgl. Behandlungsindikation:
  - US-ONSD: 5,73 mm (Sensitivität 92% und Spezifität 86,4%)
  - US-ODE: 0,43 mm (Sensitivität 72% und Spezifität 77,3%)
  - (Fundoskopie Sensitivität 46% und Spezifität 100%)
- Die ICP Reduktion nach Behandlung wird mit der Ultraschalldiagnostik früher und zuverlässiger angezeigt

# Transorbital point-of-care ultrasound versus fundoscopic papilledema to support treatment indication for potentially elevated intracranial pressure in children



<u>US-based grading of Optic Disc elevation:</u>		<u>Risk for raised ICP:</u>
0	< 0.1mm (negative predictive value 83.3%, Sensitivity: 98% false negative risk: 2%)	} low- moderate high very high
I	0.10 - 0.42mm (negative predictive value 60%, false negative risk: 12%)	
II	<b>0.43mm</b> - 0.67mm (positive predictive value for raised ICP = 90%, OR= 11)	
III	> <b>0.675mm</b> (> 90% risk for papilledema & papilledema is 100% specific for raised ICP)	



# The State of the Field of Pediatric Multimodality Neuromonitoring

Jennifer C. Erklauer and Yi-Chen Lai

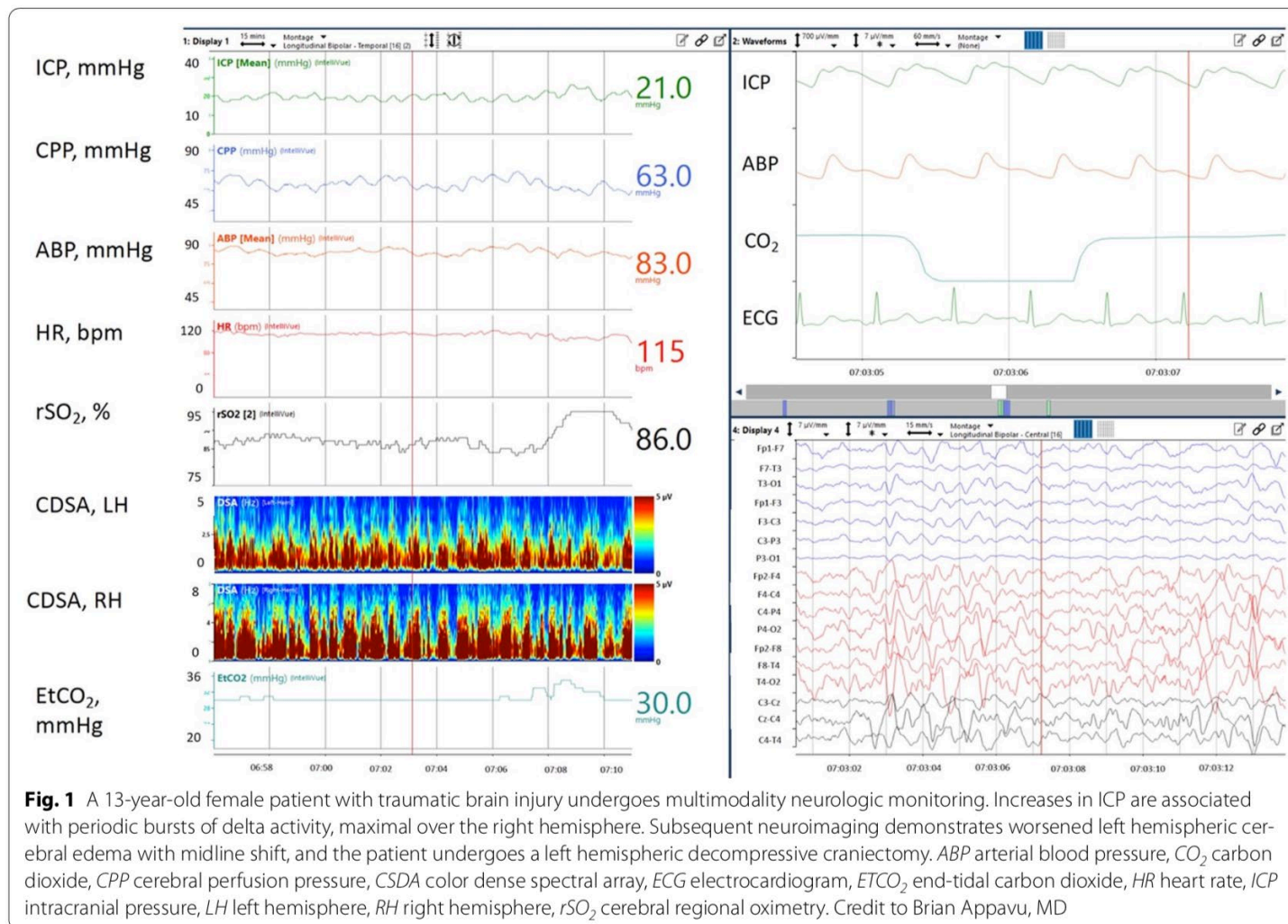
Child's Nervous System

<https://doi.org/10.1007/s00381-023-06186-7>

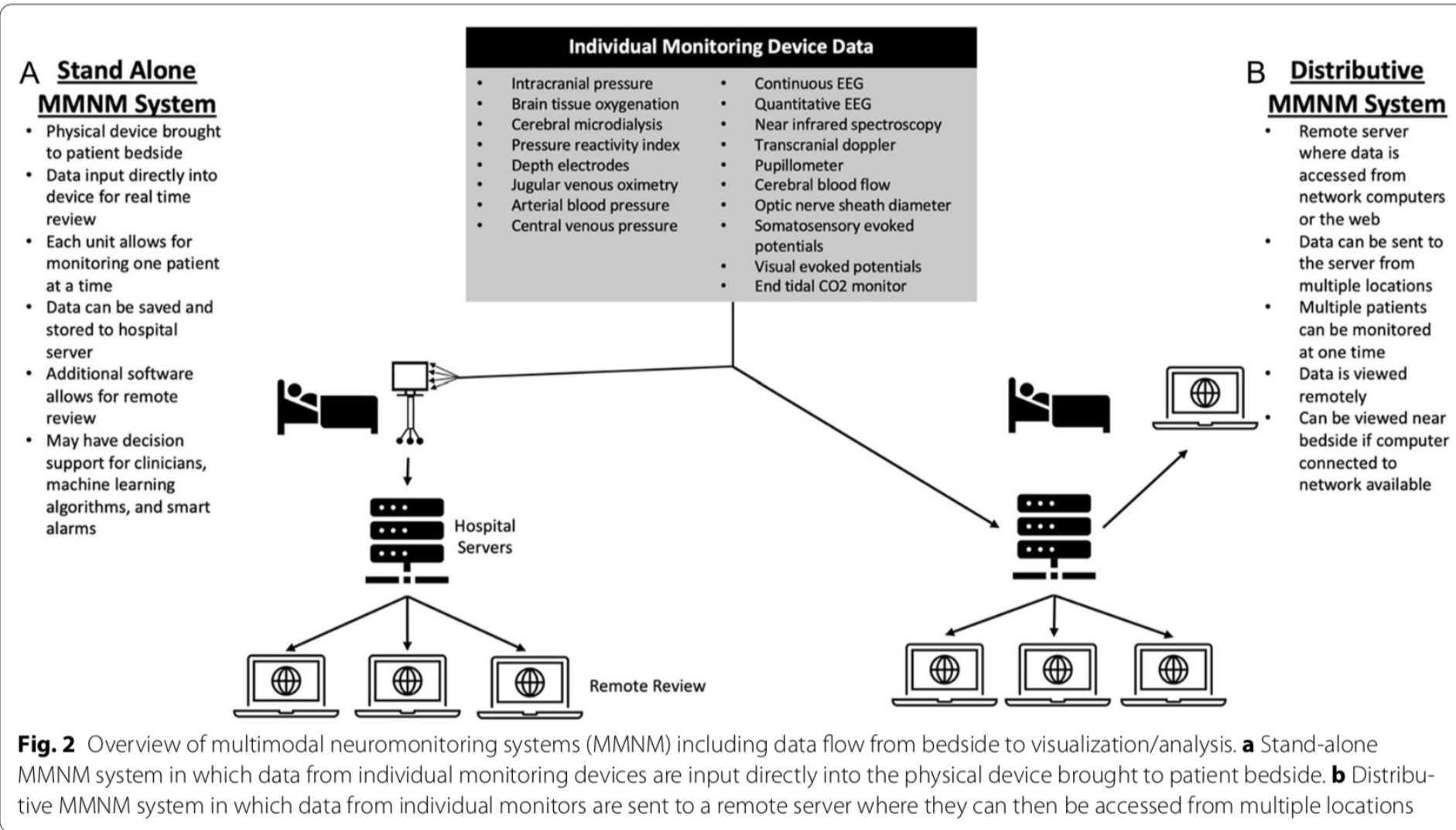
Published online 14 November 2023



# The State of the Field of Pediatric Multimodality Neuromonitoring



# The State of the Field of Pediatric Multimodality Neuromonitoring



**Fig. 2** Overview of multimodal neuromonitoring systems (MMNM) including data flow from bedside to visualization/analysis. **a** Stand-alone MMNM system in which data from individual monitoring devices are input directly into the physical device brought to patient bedside. **b** Distributive MMNM system in which data from individual monitors are sent to a remote server where they can then be accessed from multiple locations

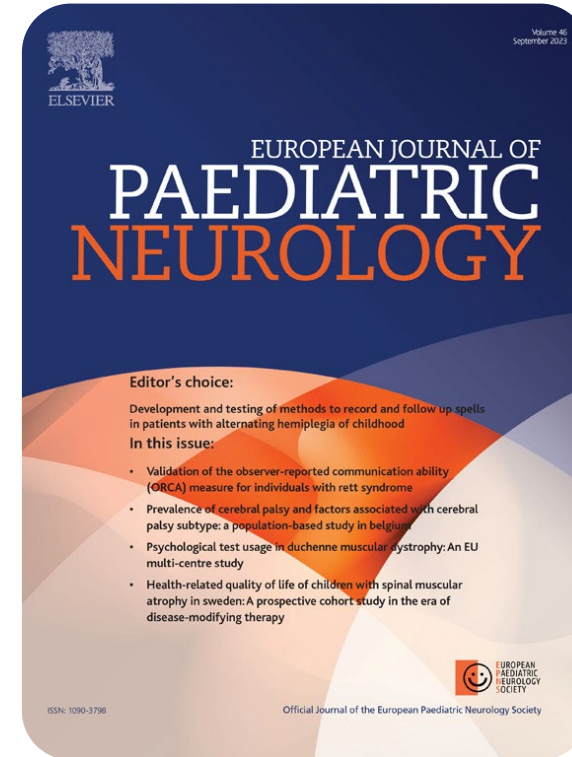
# The State of the Field of Pediatric Multimodality Neuromonitoring

**Table 3 Considerations for implementation of a pediatric multi-modal neuromonitoring program [7]**

---

Identify key stakeholders: nursing, pediatric critical care, pediatric neurocritical care, pediatric neurology, pediatric neurosurgery, radiology, biomedical engineering department, information technology, and hospital administration
Identify multi-modal neuromonitoring system to be used (kiosk vs. distributed) and software required
Identify planned monitoring devices and ensure compatibility with multi-modal neuromonitoring system. Identify additional connections that may be required
Determine mechanism for data transfer, data storage, and interface with EMR
Identify patient populations to be monitored
Identify method for bedside and remote review
Identify composition of multi-modal neuromonitoring clinical team
Determine process for multi-disciplinary review and discussion of data
Determine standardized process for reporting/documentation of results of multimodal monitoring
Develop patient care/management protocols for multimodal neuromonitoring
Create process for equipment care, setup, and connection when patient identified
Create process for cleaning and preparation of multimodal system for next patient if kiosk monitor is used
Determine plan for education of nurses and bedside clinicians

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Vielen Dank!