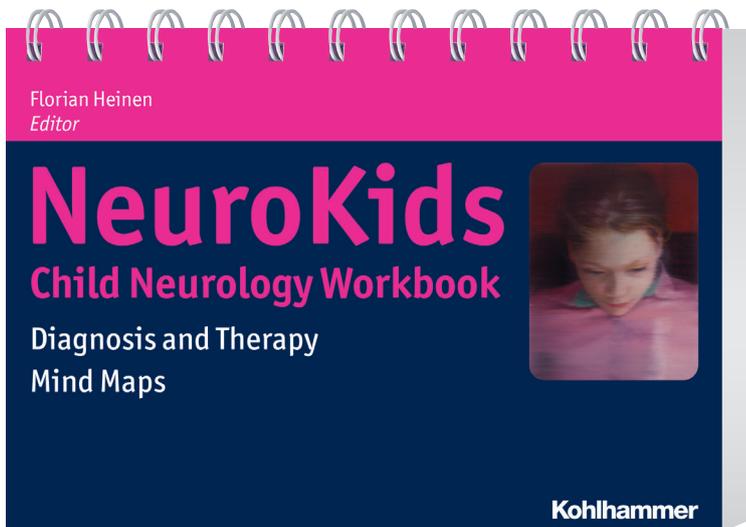




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APP & WORKBOOK



App based on the

NeuroKids – Child Neurology Workbook

Edited by Florian Heinen

2017. 555 pages. Wire-0-Binding

€ 79,-

ISBN 978-3-17-032161-8



English, long version

The dynamically developing field of child neurology is a central and major topic in paediatrics.

NeuroKids is the innovative answer to the clinical challenges in child neurology as app and corresponding workbook.

With the basic idea of mind maps, the classic textbook has been further developed to provide more targeted information, designed for daily professional practice, bundling the broad clinical spectrum. The most important fields of acute and chronic child neurology you will find practically presented and well structured. A uniform classification allows a quick orientation: The Paediatric Clinical Scouts (PCS) provide a condensed knowledge overview and will guide you to diagnostic work-up and therapeutic decision-making. The PCS focus on patients and provide professional skills for emergency medicine, for health care of chronically ill children and adolescents and rehabilitative and palliative therapy.

The PCS are complemented by a comprehensive, precise, internationally oriented drug register as well as schemes for neurological and developmental neurological examination with the evidence of good practice.

NeuroKids – App & Workbook are identical in content and complement each other, ideal for daily work.

NeuroKids – App & Workbook address to those with clinical responsibility for children and adolescents with disorders of the central and peripheral nervous system – as well for ambulant as stationary settings, with the perspective of child neurology, child and adolescent medicine as well as child and adolescent psychiatry.

With a preface of Lieven Lagae, President of the European Paediatric Neurology Society:

„I am very happy that NeuroKids was endorsed and supported by the board of the European Paediatric Neurology Society (EPNS). We sincerely believe this is a major step forward in training and educating young and old paediatric neurologists and are therefore extremely happy to collaborate in this project.“

In collaboration with the:

- European Paediatric Neurology Society (EPNS)

Additional cooperation partners are:

- Ludwig-Maximilians-University Munich, Germany Paediatric Neurology and Developmental Medicine, Children's Hospital
- Ludwig-Maximilians-University Munich, Germany Institute for Medical Education (DAM)
- Ludwig-Maximilians-University Munich, Germany Center for International Health (CIH)

English, short version

NeuroKids – App & Workbook are the innovative answer to the clinical challenges in child neurology. A uniform classification in form of mind maps allows a quick orientation: The Paediatric Clinical Scouts (PCS) will guide you to diagnostic work-up and therapeutic decision-making. The PCS focus on patients and give professional skills for emergency medicine, health care of chronically ill children and adolescents and rehabilitative and palliative therapy.

The PCS are complemented by a comprehensive, precise, internationally oriented drug register as well as schemes for neurological and developmental neurological examination with the evidence of good practice.

Deutsch, Langversion

Kinderneurologie ist ein zentrales und besonders großes pädiatrisches Schwerpunktfach mit dynamischer Entwicklung.

NeuroKids ist die innovative Antwort auf die klinischen Herausforderungen des Alltags in Form von App und korrespondierendem Workbook – in englischer Sprache.

Mit der Grundidee von Mind Maps wurde das klassische Lehrbuch in Richtung rascherer und gezielterer Information weiterentwickelt, auf die tägliche Berufspraxis ausgelegt, das breite klinische Spektrum bündelnd. Die wichtigsten Gebiete akuter und chronischer Kinderneurologie sind so praktisch und übersichtlich aufbereitet.

Eine einheitliche Gliederung ermöglicht eine rasche Orientierung: Die Paediatric Clinical Scouts (PCS) bieten eine kondensierte Wissensübersicht und sind Wegweiser zu diagnostischer Aufarbeitung und therapeutischer Entscheidung. Die PCS fokussieren auf Patienten und geben Handlungskompetenz für die akute Notfallversorgung ebenso wie für die Betreuung chronisch komplex kranker Kinder und Jugendlicher bis hin zu rehabilitativer und palliativer Medizin.

Komplementiert werden die PCS durch ein umfangreiches, präzises, international orientiertes Medikamentenregister sowie Schemata für die neurologische und entwicklungsneurologische Untersuchung mit der Evidenz bewährter Praxis.

NeuroKids – App & Workbook sind im Inhalt identisch, ergänzen sich in ihren Formaten ideal für die tägliche Arbeit und erlauben einen praktischen Workflow „im eigenen Stil“.

NeuroKids – App & Workbook richten sich an alle, die klinische Verantwortung für Kinder und Jugendliche mit Störungen des zentralen oder peripheren Nervensystems tragen – im ambulanten wie stationären Bereich, unter den Blickwinkeln der Kinderneurologie, der Kinder- und Jugendmedizin, der Neurologie und der Kinder- und Jugendpsychiatrie.

Mit einem Geleitwort von Lieven Lagae, Präsident der European Paediatric Neurology Society:

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Weitere Kooperationspartner sind:

- Ludwig-Maximilians-Universität München, Deutschland, Abteilung Neuropädiatrie, Entwicklungsneurologie und Sozialpädiatrie, Kinderklinik und Kinderpoliklinik im Dr. von Haunerschen Kinderspital
- Ludwig-Maximilians-Universität München, Deutschland, Institute für Didaktik und Ausbildungsforschung (DAM)
- Ludwig-Maximilians-Universität München, Deutschland, Center for International Health (CIH)

Deutsch, Kurzfassung

NeuroKids – App & Workbook sind die innovative Antwort auf die klinischen Herausforderungen des Alltags von Neuropädiatern – in englischer Sprache. Eine einheitliche Gliederung in Form von Mind Maps ermöglicht eine rasche Orientierung: Die Paediatric Clinical Scouts (PCS) sind Wegweiser zu diagnostischer Aufarbeitung und therapeutischer Entscheidung. Die PCS fokussieren auf Patienten und geben Handlungskompetenz für die akute Notfallversorgung ebenso wie für die Betreuung chronisch komplex kranker Kinder und Jugendlicher bis hin zu rehabilitativer und palliativer Medizin.

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- A.05 Acute increased intracranial pressure (ICP)
- A.06 Guillain-Barré Syndrome (GBS)
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P Hydrocephalus, Myelomeningocele (MMC), Chiari Malformations

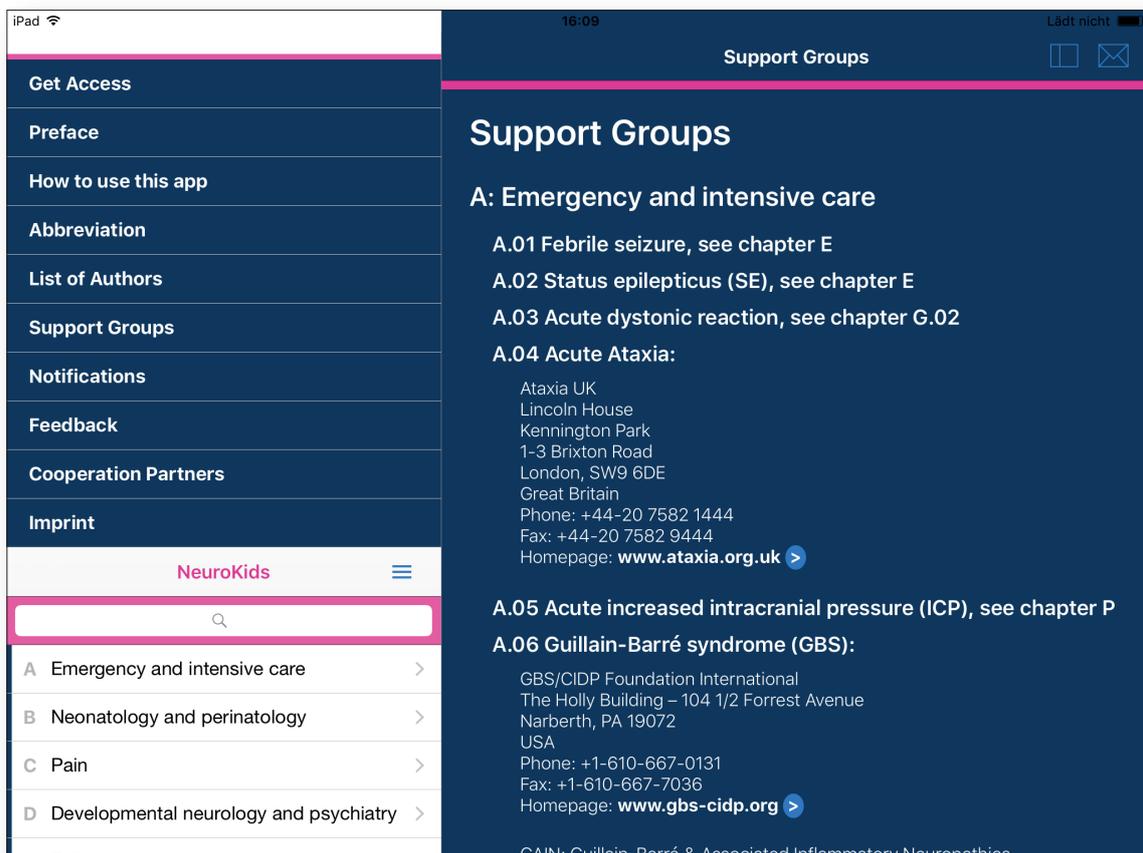
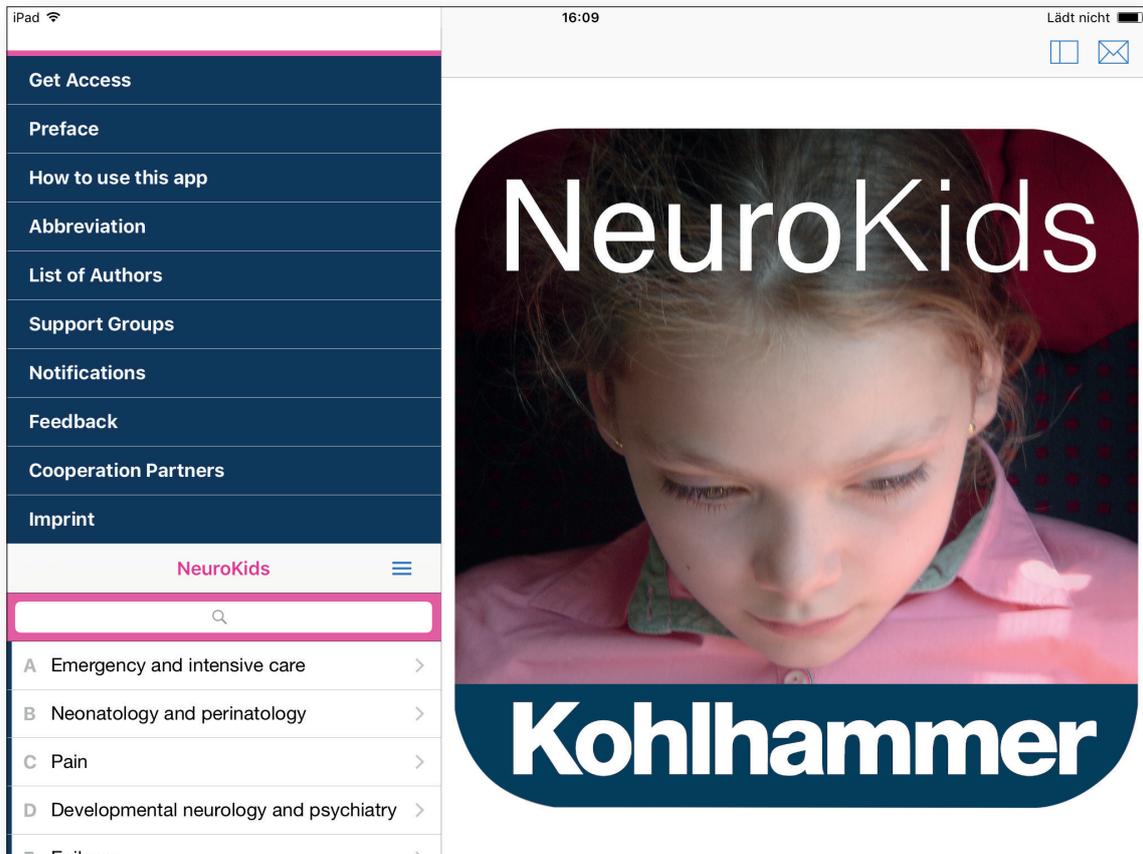
- P.01 Hydrocephalus in infants
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- Q.01 Hip joint
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Medication



16:10 A.01 Febrile seizures Therapy

Continuing febrile seizure (> 3 minutes)

- ▶ Diazepam rectally (< 15 kg 5 mg, > 15 kg 10 mg)
- ▶ Diazepam (as IV injection over 3-5 minutes) 0,25 mg/kg/single dose

Continuing seizure:

- ▶ Midazolam IV 0,1-0,2 mg/kg/single dose
- or
- ▶ Lorazepam IV 0,05-0,1 mg/kg/single dose
- or
- ▶ Diazepam 0,25 mg/kg/single dose

In case of continuing seizure:

- ▶ Phenobarbital IV 10 mg/kg/single dose

Continuing fever: antipyretic treatment

- ▶ Physical methods
- ▶ Antipyretic drug treatment
 - Paracetamol rectally: 75 mg < 6 months, 125 mg 6-24 months, 250 mg 2-8 years, 500 mg > 8 years every 6-8 hours orally; 10-15 mg/kg/single dose every 6 h; IV: 10-15 mg/kg/single dose orally every 6 h (max. 60 mg/kg/d)
 - Ibuprofen 2,5-10 mg/kg/single dose (max. 600 mg/single dose) every 6-8 h orally
 - Metamizole 10 mg/kg/single dose every 4-6 h p.o./IV

Spontaneously stopped febrile seizure

- ▶ Physical examination (complete neurological recovery within approx. 1-2 hours?)
- ▶ Monitoring

Questions, you should discuss with the parents:

- ▶ Diagnosis?
- ▶ How often can a febrile seizure occur?
- ▶ Does a simple febrile seizure have adverse effects on neurocognition or development?
- ▶ Is a febrile seizure the beginning of a (lifelong) epilepsy?
- ▶ Are there effective preventive procedures? (E. g. is antipyretic treatment working as a relapse prophylaxis?)

Consultation after a febrile seizure

- ▶ At which date?
- ▶ Which consultant?
- ▶ Which examinations?

Drug treatment in case of a relapse

- ▶ Diazepam rectally (< 15 kg 5 mg, > 15 kg 10 mg)
 - How to use?
 - How to preserve?

Diagnosis Therapy

16:10 A.01 Febrile seizures Therapy

Continuing febrile seizure (> 3 minutes)

- ▶ Diazepam rectally (< 15 kg 5 mg, > 15 kg 10 mg)
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In case of continuing seizure:

- ▶ Phenobarbital IV 10 mg/kg/single dose

Continuing fever: antipyretic treatment

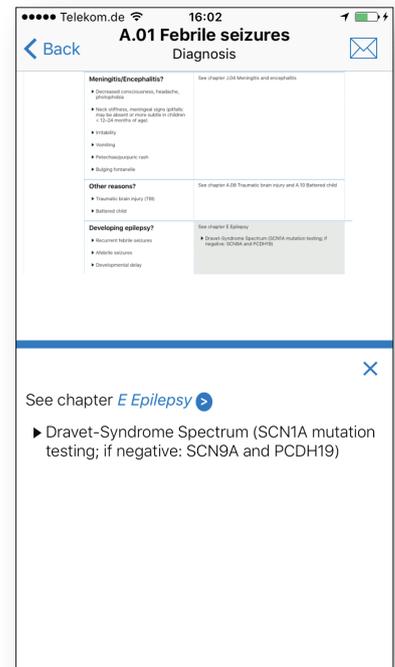
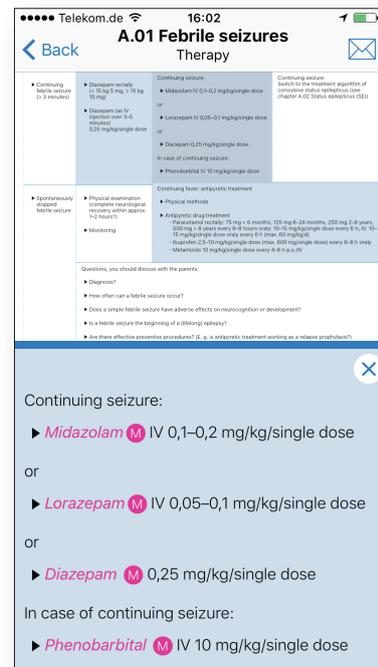
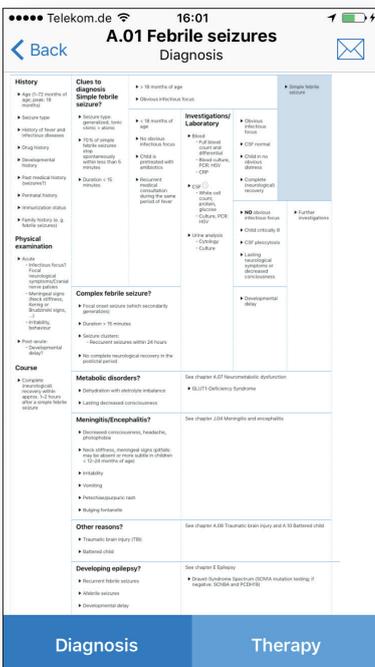
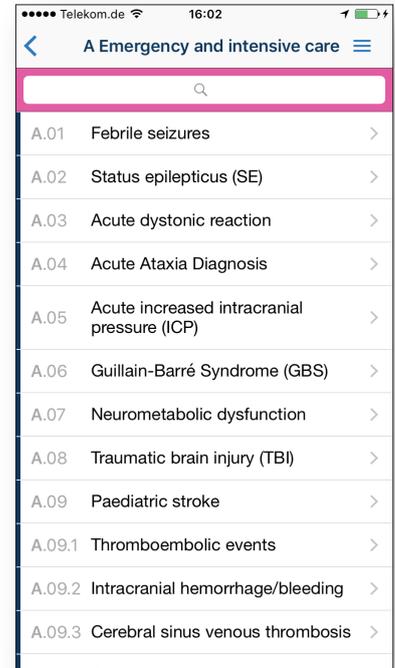
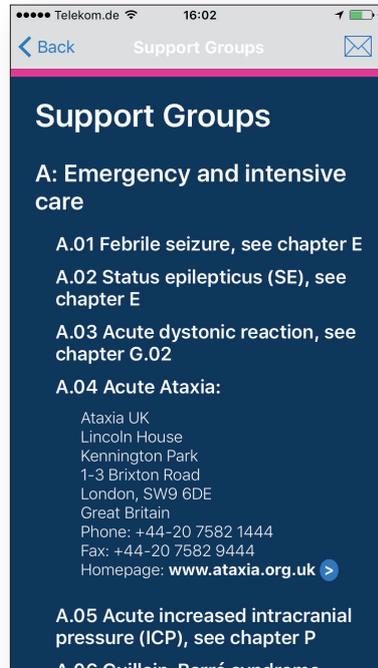
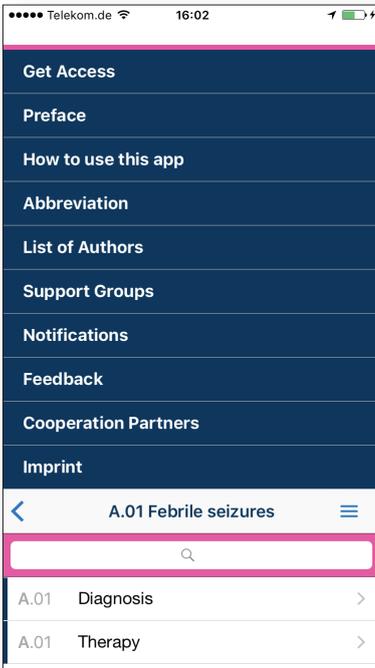
- ▶ Physical methods
- ▶ Antipyretic drug treatment
 - Paracetamol rectally: 75 mg < 6 months, 125 mg 6-24 months, 250 mg 2-8 years, 500 mg > 8 years every 6-8 hours orally; 10-15 mg/kg/single dose every 6 h; IV: 10-15 mg/kg/single dose orally every 6 h (max. 60 mg/kg/d)
 - Ibuprofen 2,5-10 mg/kg/single dose (max. 600 mg/single dose) every 6-8 h orally
 - Metamizole 10 mg/kg/single dose every 4-6 h p.o./IV

Spontaneously stopped febrile seizure

- ▶ Physical examination (complete neurological recovery within approx. 1-2 hours?)
- ▶ Monitoring

Drug treatment in case of a relapse

- ▶ **Diazepam** rectally (< 15 kg 5 mg, > 15 kg 10 mg)
 - How to use?
 - How to preserve?



PCS

A.01 Febrile seizures | PCS-Diagnosis 1/2

Emergency and intensive care

History <ul style="list-style-type: none"> ▶ Age (1–72 months of age; peak: 18 months) ▶ Seizure type ▶ History of fever and infectious diseases ▶ Drug history ▶ Developmental history ▶ Past medical history (seizures?) ▶ Perinatal history ▶ Immunization status ▶ Family history (e. g. febrile seizures) Physical examination <ul style="list-style-type: none"> ▶ Acute <ul style="list-style-type: none"> – Infectious focus? Focal neurological symptoms/ Cranial nerve palsies – Meningeal signs (Neck stiffness, Kernig or Brudzinski signs, ...) – Irritability, behaviour ▶ Post-acute: <ul style="list-style-type: none"> – Developmental delay? Course <ul style="list-style-type: none"> ▶ Complete (neurological) recovery within approx. 1–2 hours after a simple febrile seizure 	Clues to diagnosis Simple febrile seizure? <ul style="list-style-type: none"> ▶ Seizure type: generalized, tonic clonic > atonic ▶ 70% of simple febrile seizures stop spontaneously within less than 5 minutes ▶ Duration < 15 minutes 	<ul style="list-style-type: none"> ▶ > 18 months of age ▶ Obvious infectious focus <ul style="list-style-type: none"> ▶ < 18 months of age ▶ No obvious infectious focus ▶ Child is pretreated with antibiotics ▶ Recurrent medical consultation during the same period of fever 	Investigations/ Laboratory <ul style="list-style-type: none"> ▶ Blood <ul style="list-style-type: none"> – Full blood count and differential – Blood culture, PCR: <ul style="list-style-type: none"> – HSV – CRP ▶ CSF¹ <ul style="list-style-type: none"> – White cell count, protein, glucose – Culture, PCR: HSV ▶ Urine analysis <ul style="list-style-type: none"> – Cytology – Culture 	<ul style="list-style-type: none"> ▶ Obvious infectious focus ▶ CSF normal ▶ Child in no obvious distress ▶ Complete (neurological) recovery <ul style="list-style-type: none"> ▶ NO obvious infectious focus ▶ Child critically ill ▶ CSF pleocytosis ▶ Lasting neurological symptoms or decreased consciousness <ul style="list-style-type: none"> ▶ Developmental delay 	<ul style="list-style-type: none"> ▶ Simple febrile seizure ▶ Further investigations
	Complex febrile seizure? <ul style="list-style-type: none"> ▶ Focal onset seizure (which secondarily generalizes) ▶ Duration > 15 minutes ▶ Seizure clusters: <ul style="list-style-type: none"> – Recurrent seizures within 24 hours – No complete neurological recovery in the postictal period 	Metabolic disorders? <ul style="list-style-type: none"> ▶ Dehydration with electrolyte imbalance ▶ Lasting decreased consciousness 	Meningitis/Encephalitis? <ul style="list-style-type: none"> ▶ Decreased consciousness, headache, photophobia ▶ Neck stiffness, meningeal signs (pitfalls: may be absent or more subtle in children < 12–24 months of age) ▶ Irritability ▶ Vomiting ▶ Petechiae/purpuric rash ▶ Bulging fontanelle 	<ul style="list-style-type: none"> ▶ See chapter A.07 Neurometabolic dysfunction ▶ GLUT1-Deficiency Syndrome 	<ul style="list-style-type: none"> ▶ See chapter J.04 Meningitis and encephalitis
	Other reasons? <ul style="list-style-type: none"> ▶ Traumatic brain injury (TBI) ▶ Battered child 		<ul style="list-style-type: none"> ▶ See chapter A.08 Traumatic brain injury and A.10 Battered child 		

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A.01 Febrile seizures | PCS-Therapy 1/1

Emergency and intensive care

<ul style="list-style-type: none"> ▶ Continuing febrile seizure (> 3 minutes) 	<ul style="list-style-type: none"> ▶ Diazepam rectally (< 15 kg 5 mg, > 15 kg 10 mg) ▶ Diazepam (as IV injection over 3–5 minutes) 0,25 mg/kg/single dose 	Continuing seizure: <ul style="list-style-type: none"> ▶ Midazolam IV 0,1–0,2 mg/kg/single dose Or ▶ Lorazepam IV 0,05–0,1 mg/kg/single dose Or ▶ Diazepam 0,25 mg/kg/single dose In case of continuing seizure: <ul style="list-style-type: none"> ▶ Phenobarbital IV 10 mg/kg/single dose 	Continuing seizure: <ul style="list-style-type: none"> ▶ Switch to the treatment algorithm of convulsive status epilepticus (see chapter A.02 Status epilepticus (SE))
<ul style="list-style-type: none"> ▶ Spontaneously stopped febrile seizure 	<ul style="list-style-type: none"> ▶ Physical examination (complete neurological recovery within approx. 1–2 hours?) ▶ Monitoring 	Continuing fever: antipyretic treatment <ul style="list-style-type: none"> ▶ Physical methods ▶ Antipyretic drug treatment <ul style="list-style-type: none"> – Paracetamol rectally: 75 mg < 6 months, 125 mg 6–24 months, 250 mg 2–8 years, 500 mg > 8 years every 6–8 hours orally; 10–15 mg/kg/single dose every 6 h; – IV: 10–15 mg/kg/single dose orally every 6 h (max. 60 mg/kg/d) – Ibuprofen 2,5–10 mg/kg/single dose (max. 600 mg/single dose) every 6–8 h orally – Metamizole 10 mg/kg/single dose every 4–6 h p.o./IV 	
	Questions, you should discuss with the parents: <ul style="list-style-type: none"> ▶ Diagnosis? ▶ How often can a febrile seizure occur? ▶ Does a simple febrile seizure have adverse effects on neurocognition or development? ▶ Is a febrile seizure the beginning of a (lifelong) epilepsy? ▶ Are there effective preventive procedures? (E. g. is antipyretic treatment working as a relapse prophylaxis?) 		
	Consultation after a febrile seizure <ul style="list-style-type: none"> ▶ At which date? ▶ Which consultant? ▶ Which examinations? 		
	Drug treatment in case of a relapse <ul style="list-style-type: none"> ▶ Diazepam rectally (< 15 kg 5 mg, > 15 kg 10 mg) <ul style="list-style-type: none"> – How to use? – How to preserve? 		

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Medication

A

Acetazolamide (AZA)

Dosage:

- ▶ epilepsy: 8–30 mg/kg/d (as stated in the Summary of Product Characteristics, SPC)
- ▶ type 2 episodic ataxia: 5–10 mg/kg/d (off-label)
- ▶ idiopathic intracranial hypertension/pseudotumor cerebri (off-label)
 - infants: initial dose 8 mg/kg/d as 3 separate doses, increase if required to a maximum of 100 mg/kg/d
 - children: start with 25 mg/kg/d, increase by 25 mg/kg/d if required (max. 100 mg/kg/d or 2 g/d)
 - adolescents: start with 25 mg/kg/d, increase by 25 mg/kg/d if required (max. 100 mg/kg/d or 2 g/d)
- ▶ central respiratory disorder with accompanying hypoxemia: 7.5–10.0 mg/kg/d (caution: metabolic decompensation)

Neuropaediatric indications:

- reduction of cerebrospinal fluid (CSF) production with increase of intracranial pressure (ICP) (including posthemorrhagic ventricular dilatation and idiopathic intracranial hypertension)
- alternative therapy for partial, generalized or absence epilepsy (short-term)
- type 2 episodic ataxia
- central respiratory disorder with accompanying hypoxemia

Mechanism of action:

- carbonic anhydrase inhibitor

Relevant contraindications:

- hypokalemia, hyponatremia

Relevant side effects and interactions:

- metabolic acidosis
- frequent urination
- skin rash
- paresthesia
- hypercalciuria/nephrolithiasis
- nephrotoxic in combination with NSAIDs
- increase of Carbamazepine level
- (rarely) Stevens-Johnson syndrome

Approval status: –

Sources:

- Germany – SPC: –
- USA – T:
 - epilepsy
 - oral
 - 4–16 mg/kg/d as 1–4 separate doses, not to exceed 30 mg/kg/d or 1 g/d; extended release capsule is not recommended for treatment of epilepsy
 - oedema
 - oral or IV
 - 5 mg/kg/d as a SD or 150 mg/m²/d as a SD
- United Kingdom – BNFC:
 - epilepsy
 - oral or by slow intravenous injection
 - neonate: initial dose 2.5 mg/kg 2–3 times daily; maintenance dose 5–7 mg/kg 2–3 times daily
 - children 1 month–12 years: initial dose 2.5 mg/kg 2–3 times daily, followed by 5–7 mg/kg 2–3 times daily, max. 750 mg/d (maintenance dose)
 - children 12–18 years: 250 mg 2–4 times daily
 - raised intracranial pressure
 - oral or by slow intravenous injection
 - children 1 month–12 years: initial dose 8 mg/kg 3 times daily, increasing as necessary to max. 100 mg/kg/d

Comment:

- careful use of long term administration
- frequent control of acid-base homeostasis as well as electrolytes

Acetylsalicylic acid (ASA)

Dosage:

- ▶ stroke prophylaxis: 1–3 mg/kg/d
- ▶ initial dose for acute stroke treatment or in case of temporary symptoms: 3–5 mg/kg/d (information only for adults available, not for children)
- ▶ after 3–6 months of LMWH therapy following the clinically acute phase, in a stable situation: 3–5 mg/kg/d (no information on dosage and tolerability of ASA available for newborns)
- ▶ acute tension-type headache treatment: 10–15 mg/kg p.o./IV
- ▶ acute migraine treatment: 10–15 mg/kg p.o./IV
- ▶ migraine prophylaxis: 2–3 mg/kg/d p.o.
- ▶ Kawasaki disease with fever: 50 mg/kg/d or 80–100 mg/kg/d as 4 separate doses over 48–72 h, followed by 3–5 mg/kg/d; discontinue treatment after 6–8 weeks

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A

Neuropaediatric indications:

- primary and secondary stroke prevention/prophylaxis
- tension-type headache
- acute migraine treatment
- migraine prophylaxis
- Kawasaki disease

Mechanism of action:

- inhibition of platelet aggregation through inhibition of cyclo-oxygenase with consecutive reduction of thromboxane A₂ and prostacyclin synthesis

Relevant contraindications:

- severe liver or renal failure
- children and adolescents with febrile illness

Relevant side effects and interactions:

- very rare at low dose
- nausea, heartburn, vomiting
- bronchoconstriction
- mucosal irritation, gastrointestinal bleeding and peptic ulcer
- relapse of (chronic) inflammatory bowel diseases
- Reye syndrome in children (and adolescents) with febrile illness (historical)

Approval status:

- varies depending on product (see SPC)

Sources:

- Germany – SPC:

Age:	Single dose (SD):
7–9 years	1 tablet, i.e. 250 mg
9–12 years	1–1½ tablet, i.e. 250–375 mg
> 12 years	2–3 tablets, i.e. 500–750 mg

- The SD can be given every 4–8 h, if necessary.

– USA – T:

- Kawasaki disease

- oral

– 80–100 mg/kg/d divided into 4 doses, i.e. 20–25 mg/kg, administered every 6 h for up to 14 d (until fever resolves for at least 48 h); then decrease the dose to 3–5 mg/kg/d once daily. In patients without coronary artery abnormalities, continue with the low dose for 6–8 weeks. In patients with coronary artery abnormalities, maintain the low-dose treatment indefinitely (in addition to therapy with Warfarin).

– analgesic

- oral, rectal, IV
 - 10–15 mg/kg every 4–6 h, max. dose: 4 g/d

– anti-inflammatory

- oral
 - initially: 60–90 mg/kg/d divided into several doses
 - usual maintenance dose: 80–100 mg/kg/d given in appropriate doses every 6–8 h
 - monitor ASA serum concentration

– antiplatelet effects

- adequate paediatric studies have not been performed; paediatric dosage is derived from adult studies and clinical experience and is not well established
- Suggested doses have ranged from 1–5 mg/kg/d to 5–10 mg/kg/d as a SD. Doses are typically rounded to a convenient amount.
- arterial ischemic stroke, recurrent: 1–5 mg/kg/d as a SD after anticoagulation therapy has been discontinued.

– United Kingdom – BNFC:

- Kawasaki disease

- oral

– neonates: initially 32 mg/kg/d as 4 separate doses for 2 weeks or until afebrile, followed by 5 mg/kg/d as a SD for 6–8 weeks; if no evidence of coronary lesions after 8 weeks, discontinue treatment or seek expert advice

– children 1 month–12 years: initially 30–50 mg/kg/d as 4 separate daily doses for 2 weeks or until afebrile, then 2–5 mg/kg/d as a SD for 6–8 weeks; if no evidence of coronary lesions after 8 weeks, discontinue treatment or seek expert advice

– inhibition of platelet aggregation, prevention of thrombus formation after cardiac surgery

- oral

– neonates: 1–5 mg/kg/d as a SD

– children 1 month–12 years: 1–5 mg/kg/d (usual max. 75 mg) as a SD

– children 12–18 years: 75 mg/d as a SD

IV comment:

- increased (potentially/historical) risk of developing Reye syndrome (< 12 years)
- should not be administered during acute febrile disease (especially varicella disease and influenza)
- optional monitoring of anticoagulation: platelet function testing

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Prof. Dr. med. Prof. h.c. Florian Heinen

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Head of the Department for Paediatric Neurology and
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Training and positions

Since 2003

Head of the Department for Pediatric Neurology and
Developmental Medicine, Dr. von Hauner Children's
Hospital, University of Munich

Medical Director of the integrated Social Pediatric
Center, LMU Munich

Honorary professor at Universidade catholica de
Mozambique UCM, Beira Mozambique

1999-2003

Head of the Children's Hospital Duisburg (Academic
Hospital of the University Duisburg-Essen)

1999

Professor in the field of paediatrics and paediatric
neurology at the Albert-Ludwigs-University,
Freiburg i Br., Germany

1987-1997

Post-graduate studies at the Albert-Ludwigs-Univer-
sity Freiburg in the fields of neurology, psychiatry and
pediatrics, subspecialty Pediatric Neurology



Fields of clinical and research interests

- Migraine
- Paediatric Stroke
- Movement disorders (cerebral palsy and dystonia)
- Development, Motor Development (Transcranial
Magnetic Stimulation)
- Fetal Alcohol Spectrum Disorders (FASD/FAS)
- Global Health

Pioneering interventional Neuropaediatrics

- Botulinum Toxin therapy for children
- Sonography guidance for Botulinum Toxin injections
- Robotics for children
- Repetitive peripheral transcranial magnetic
stimulation (rpTMS) for migraine

Education

- Mind Maps –
paediatric clinical scouts in paediatric neurology