



Pathophysiology of Pediatric Traumatic Brain Injury

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The national incidence of traumatic brain injury (TBI) exceeds that of any other disease in the pediatric population. In the United States the Centers for Disease Control and Prevention (CDC) reports 697,347 annual TBIs in children ages 0–19 that result in emergency room visits, hospitalization or deaths. There is a bimodal distribution within the pediatric TBI population, with peaks in both toddlers and adolescents. Preclinical TBI research provides evidence for age differences in acute pathophysiology that likely contribute to long-term outcome differences between age groups. This review will examine the timecourse of acute pathophysiological processes during cerebral maturation, including calcium accumulation, glucose metabolism and cerebral blood flow. Consequences of pediatric TBI are complicated by the ongoing maturational changes allowing for substantial plasticity and windows of vulnerabilities. This review will also examine the timecourse of later outcomes after mild, repeat mild and more severe TBI to establish developmental windows of susceptibility and altered maturational trajectories. Research progress for pediatric TBI is critically important to reveal age-associated mechanisms and to determine knowledge gaps for future studies.

Keywords: pediatric, adolescence, traumatic brain injury, metabolism, inflammation, long-term outcome, behavior

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Specialty section:

This article was submitted to
Neurotrauma,
a section of the journal
Frontiers in Neurology

Received: 10 April 2021

Accepted: 21 June 2021

Published: 15 July 2021

Citation:

Serpa RO, Ferguson L, Larson C,
Ballard J, Cooke S, Greco T and
Prins ML (2021) Pathophysiology of
Pediatric Traumatic Brain Injury.
Front. Neurol. 12:696610.
doi: 10.3389/fneur.2021.696610

INTRODUCTION

Addressing traumatic brain injury (TBI) in the pediatric population is exceptionally complex. The pediatric population is a heterogeneous age group that spans across numerous significant developmental milestones. Epidemiological data from the Centers for Disease Control and Prevention (CDC) shows a bimodal increase in the incidence of TBI within the pediatric population with annual incidence of 315,979 among children between 0 and 4 years of age and 475,876 among adolescents (15–24 years old) (1). The distribution of TBI between the sexes also differs, with males comprising 55.3% of children (age 0–4) and 62.8% of adolescent (age 15–19) TBIs (2). Types of brain injuries between both children and adolescent groups also differ. Toddlers/young children are more likely to sustain a TBI from a fall vs. adolescents who are more likely to suffer injuries from sports, motor-vehicle accidents, and assaults (1, 3). The heterogenous nature of brain maturation compounded by emergence of sex differences and different types of injuries sustained, makes assessment of pathophysiological responses, vulnerabilities, and recovery trajectories very difficult. Adding to this are socioeconomic status, insurance disparities, and racial inequities that can contribute to long-term outcomes and recovery success in both children and adolescent TBI patients. This review will address the known acute and long-term pathophysiological mechanisms for children and adolescent TBI to provide clinical and preclinical timelines to guide future research.

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Pediatric Traumatic Brain Injury Vicki Anderson, Keith Owen Yeates, 2010-02-04 Traumatic brain injury TBI is a leading cause of death and disability in children and adolescents around the world and represents a global public health issue Major improvements in the medical treatment of the initial injury have increased survival rates resulting in the focus shifting to consider the subsequent and longer term cognitive emotional and behavioral consequences for the recovering child or adolescent These disabilities if left untreated continue into adulthood with consequent economic and societal costs This book reviews the research into the consequences of TBI emphasizing the translation of new understanding into effective treatments and interventions and identifying promising areas for further study This will be essential reading for neuropsychologists neurologists psychiatrists clinical psychologists and pediatricians

New Frontiers in Pediatric Traumatic Brain Injury Cathy Catroppa, Vicki Anderson, Miriam Beauchamp, Keith Yeates, 2016-02-26 New Frontiers in Pediatric Traumatic Brain Injury provides an evidence base for clinical practice specific to traumatic brain injury TBI sustained during childhood with a focus on functional outcomes It utilizes a biological psychosocial conceptual framework consistent with the International Classification of Functioning Disability and Health which highlights that biological psychological and social factors all play a role in disease and children s recovery from acquired brain injury With its clinical perspective it incorporates current and past research and evidence regarding advances that have occurred in outcomes predictors medical technology and rehabilitation post TBI This book is great resource for established and new clinicians and researchers graduate students and postdoctoral fellows who work in the field of pediatric TBI including psychologists neuropsychologists pediatricians and psychiatrists

National Library of Medicine Audiovisuals Catalog National Library of Medicine (U.S.), **National Library of Medicine Current Catalog** National Library of Medicine (U.S.), 1990

Pediatric Primary Care: Practice Guidelines for Nurses Beth Richardson, 2022-08-24 Pediatric Primary Care Practice Guidelines for Nurses Fifth Edition is a comprehensive resource for well child management and acute care management of childhood illnesses in a primary care setting Written by practicing experts this text is intended for advanced practice nursing students as a quick reference guide once they enter clinical practice To manage initial and follow up visits the Fifth Edition features templates for gathering first visit history as well as a template to record new information since the last visit Instructions for gathering medical history information are also included

Current Catalog National Library of Medicine (U.S.), 1993 First multi year cumulation covers six years 1965 70

Artificial Intelligence in Medicine and Surgery, 2024-11-20 Never before in human history has the opportunity to create a better future look more real or promising The information technology revolution that started in the mid twentieth century with the introduction of the transistor and then the integrated circuit has gradually transformed into the Internet revolution then the blockchain revolution and now is transforming again into the artificial intelligence AI revolution Why is now such a pivotal time with so much optimism for a

better future The answer is complex and multifaceted Perhaps most importantly the introduction of low cost AI enabled technological advances creates an ideal environment for the rapid attainment of global equity across multiple sectors of society and economy Healthcare in general and medicine in particular stand to benefit tremendously from this new previously unavailable capacity a result of the synergistic effects of modern cutting edge technologies working together For example greater access to decentralized locally based AI aided facilitated medical education may help fulfill the dreams of individuals who previously were not able to become physicians In another example increasing the use of point of care AI ML in the clinical setting promises to bring true precision medicine to populations that previously did not have adequate access to healthcare in general The level of positive disruption possible with optimized ethical and thoughtful implementation of AI in healthcare may produce constructive ripple effects not dissimilar to the introduction of cellular telephony into areas of the world without prior telephone access This book discusses both current trends and future developments in AI ML across healthcare with a focus on the transformational impact of this emerging technological domain on enhancing the access accuracy education equity quality safety and value of modern care delivery

Pediatric TBI - Current State of the Art and Future Perspective Elham Rostami,Anthony A. Figaji,P. David Adelson,2021-03-24 [International Conference on Digital Libraries \(ICDL\) 2013](#) Shantanu Ganguly,P. K. Bhattacharya,2013-11-29 ICDL conferences are recognized on of the most important platform in the world where noted expert share their experiences Many DL experts have contributed thought provoking papers in ICDL 2013 These important papers are reviewed and conceptualized into ICDL on different areas of DL proceedings The Proceedings have two volumes and has over 1100 pages

Monitoring Pathophysiology in the Injured Brain Eric P. Thelin,David W. Nelson,Adel Helmy,Niklas Marklund,2018-05-10 Pathophysiological processes in brain injured patients can be assessed with an array of methods with a goal to identify potentially deleterious events guide treatments and avoid further deterioration This eBook provides an in depth exploration into different aspects of neuro critical care monitoring and how new tools and strategies may be utilized to improve patient outcomes

The Neuroscience of Traumatic Brain Injury Rajkumar Rajendram,Victor R Preedy,Colin R. Martin,2022-05-27 Diagnosis and Treatment of Traumatic Brain Injury will improve readers understanding of the complexities of diagnosis and management of traumatic brain injuries Featuring chapters on drug delivery different treatments and rehabilitation this volume discusses in detail the impact early diagnosis and effective management has on the long term prognosis of these injuries and the lives of those affected This book will be relevant for neuroscientists neurologists clinicians and anyone working to better understand these injuries Traumatic brain injury has complex etiology and may arise as a consequence of physical abuse violence war vehicle collisions working in the construction industry and sports Cellular Molecular Physiological and Behavioral Aspects of Traumatic Brain Injury will improve readers understanding of the detailed processes arising from traumatic brain injury Featuring chapters on neuroinflammation metabolism and psychology this volume discusses the impact of these injuries on

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Diagnosis and Treatment of Traumatic Brain Injury Rajkumar Rajendram, Victor R Preedy, Colin R Martin, 2022-05-10

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Disparities and Equity in Critical Care Medicine, An Issue of Critical Care Clinics Jordan A. Kempker, Elizabeth J. Chuang, Crystal E. Brown, 2024-09-04

In this issue of Critical Care Clinics guest editors Drs Jordan A Kempker Elizabeth Chuang and Crystal E Brown bring their considerable expertise to the topic of Health Disparities and Health Equity in Critical Care Top experts cover key topics such as race ethnicity and gender disparities in management and outcomes of critically ill children and neonates critically ill adults with trauma critically ill adults with acute respiratory failure critically ill adults with acute myocardial infarction critically ill adults with acute cerebrovascular accident critically ill adults with sepsis and more Contains 14 relevant practice oriented topics including lessons learned about social disparities and critical illness during the COVID 19 pandemic disparities in the burden and impact of critical illness between industrial and resource constrained countries ethical and equity considerations and approaches regarding the rationing of critical care resources workforce diversity and equity among critical care physicians and more Provides in depth clinical reviews on health disparities and health equity in critical care offering actionable insights for clinical practice Presents the latest information on this timely focused topic under the leadership of experienced editors in the field Authors synthesize and distill the latest research and practice guidelines to create clinically significant topic based reviews

New Frontiers in

Pediatric Traumatic Brain Injury Cathy Catroppa, Vicki Anderson, Miriam Beauchamp, Keith Yeates, 2016-02-26 New Frontiers in Pediatric Traumatic Brain Injury provides an evidence base for clinical practice specific to traumatic brain injury TBI sustained during childhood with a focus on functional outcomes It utilizes a biological psychosocial conceptual framework consistent with the International Classification of Functioning Disability and Health which highlights that biological psychological and social factors all play a role in disease and children s recovery from acquired brain injury With its clinical perspective it incorporates current and past research and evidence regarding advances that have occurred in outcomes predictors medical technology and rehabilitation post TBI This book is great resource for established and new clinicians and researchers graduate students and postdoctoral fellows who work in the field of pediatric TBI including psychologists neuropsychologists pediatricians and psychiatrists

COVID-19 and Existential Positive Psychology (PP2.0): The New Science of Self-Transcendence Paul T. P. Wong, Claude-Hélène Mayer, Gökmen Arslan, In the era of COVID 19 many people have suffered high levels of stress and mental health problems To cope with the widespread of suffering physical psychological social and economical the positive psychology of personal happiness is no longer the sole approach to examine personal wellbeing Other approaches such as Viktor Frankl s theory of self transcendence provide a promising framework for research and intervention on how to achieve resilience wellbeing and happiness through overcoming suffering and self transcendence The existential positive psychology of suffering complements the positive psychology of happiness which is championed by Martin Seligman as two equal halves of the circle of wellbeing and optimal mental health This Research Topic aims to examine the different approaches to Positive Psychology and their influence on individual wellbeing during the COVID 19 era One of the exciting development in the positive psychology of wellbeing is the mounting research on the adaptive benefits of negative emotions such as shame guilt and anger as well as the dialectical process of balancing negative and positive emotions As an example based on all the empirical research and Frankl s self transcendence model Wong has developed the existential positive psychology of suffering PP2 0 as the foundation for flourishing Here are a few main tenets of PP2 0 1 Life is suffering and a constant struggle throughout every stage of development 2 The search for self transcendence is a primary motive guided by the meaning mindset and mindful mindset 3 Wellbeing cannot be sustainable without overcoming and transforming suffering In this Research Topic we welcome diverse approaches discussing the following points The dialectic process of overcoming the challenges of every stage of development as necessary for personal growth and self transcendence The role of self transcendence in resilience virtue meaning and happiness The upside of negative emotions The new science of resilience based on cultivating the resilient mindset and character How to make the best use of suffering to achieve out potentials mental health

Doc, When Can My Kid Play? Dr. Evan Mladenoff, 2024-09-24 After you get a bump on the head does it feel like everything has gone wrong in your life Do you feel like everything you do makes you worse Are you stressed out that your doctor does not know why your headaches get worse

when you play and they never go away If the answer is yes you are like so many of my patients from everyday people to professional athletes who are frustrated fed up and want to get answers for why they feel so bad after they get hit in the head They are tired of going to ER or urgent care for relief They have taken the recommended drugs they've been listening to coaches that say You're okay It's just a bruise Now get in there and play and parents who do not know what to do or who to turn to for answers Nobody has told them what they can and cannot do and whatever they do it makes them worse When all else fails they turn on themselves with a self-deprecating attitude for poor implementation lack of discipline and lack of willpower But that's all about to change Doc When Can My Kid Play is about helping people take charge of their recovery from a concussion It is unique in its use of simple effective diagnostic capabilities that are readily available but not very well known or not favored or advertised in mainstream pharmaceutical driven health care Doc When Can My Kid Play is based on over forty years of taking care of professional college and high school level athletes who have hit their heads People who have been in car accidents mothers who have hit their heads while nursing their babies people who have fallen walking their dog or just getting up in the middle of the night to go to the bathroom and hitting their head while falling These patients received the standard level of care from their team the hospital ER department or from clinics positioned as specializing in sports medicine These people in all walks of life who sustained head trauma continue to have life-altering problems and are looking for help Your search for answers of how to get help and what to do will be answered in Doc When Can My Kid Play

Recent Advances in Pediatric Neuroradiology Sahar Ahmad, Ye Wu, Yunzhi Huang, 2025-06-19 Pediatric neuroradiology is a subspecialty of radiology that focuses on the use of advanced neuroimaging techniques to study brain growth and to diagnose diseases and malformations in neonates infants toddlers children and adolescents Recent technical and methodological developments and the use of artificial intelligence AI has improved the field of pediatric neuroradiology resulting in enhanced diagnostic care personalized treatments and better patient outcomes Pediatric neuroradiology plays a key role in diagnosing characterizing and monitoring the progression of neurological disorders in children A wide variety of imaging techniques including magnetic resonance imaging MRI computed tomography CT and ultrasound US are employed for the evaluation of conditions common among children One of the most challenging aspects of pediatric neuroradiology is the need for age-specific considerations for processing and interpreting imaging exams in relation to different age groups due to the dynamic and ongoing development of the brain from neonacy to adolescence This requires knowledge of early developing patterns in neurotypical subjects and development milestones

Novel Pain Therapeutics: From Basic Research to Clinical Translation and Rehabilitation Giacinto Bagetta, Maria Tiziana Corasaniti, Tsukasa Sakurada, Damiana Scuteri, Paolo Tonin, 2021-05-25 The Digitalization of Neurology Daniel B. Hier, Michael Carrithers, Jorge Mario Rodriguez-Fernandez, Benjamin Kummer, 2023-10-31 Over the past 20 years Medicine in general and Neurology in specific has become increasingly digitized Increasingly Neurology has made a transition from qualitative to

quantitative methods The conversion of neurological data from free text to a computable format has made the application of digital tools to neurological diagnosis and prognosis a reality This Research Topic in Frontiers in Digital Health will highlight how the digitization of data has revolutionized Neurology Themes covered will include natural language processing ontologies phenotyping big data bio banks machine learning graph theory network analysis computational models electronic health records telemetry and teleneurology *Cumulated Index Medicus* ,1996

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Table of Contents Library Of Frontiers Pediatric Traumatic Brain Injury

1. Understanding the eBook Library Of Frontiers Pediatric Traumatic Brain Injury
 - The Rise of Digital Reading Library Of Frontiers Pediatric Traumatic Brain Injury
 - Advantages of eBooks Over Traditional Books
2. Identifying Library Of Frontiers Pediatric Traumatic Brain Injury
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Library Of Frontiers Pediatric Traumatic Brain Injury
 - User-Friendly Interface
4. Exploring eBook Recommendations from Library Of Frontiers Pediatric Traumatic Brain Injury
 - Personalized Recommendations
 - Library Of Frontiers Pediatric Traumatic Brain Injury User Reviews and Ratings
 - Library Of Frontiers Pediatric Traumatic Brain Injury and Bestseller Lists
5. Accessing Library Of Frontiers Pediatric Traumatic Brain Injury Free and Paid eBooks

- Library Of Frontiers Pediatric Traumatic Brain Injury Public Domain eBooks
 - Library Of Frontiers Pediatric Traumatic Brain Injury eBook Subscription Services
 - Library Of Frontiers Pediatric Traumatic Brain Injury Budget-Friendly Options
6. Navigating Library Of Frontiers Pediatric Traumatic Brain Injury eBook Formats
 - ePub, PDF, MOBI, and More
 - Library Of Frontiers Pediatric Traumatic Brain Injury Compatibility with Devices
 - Library Of Frontiers Pediatric Traumatic Brain Injury Enhanced eBook Features
 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Library Of Frontiers Pediatric Traumatic Brain Injury
 - Highlighting and Note-Taking Library Of Frontiers Pediatric Traumatic Brain Injury
 - Interactive Elements Library Of Frontiers Pediatric Traumatic Brain Injury
 8. Staying Engaged with Library Of Frontiers Pediatric Traumatic Brain Injury
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Library Of Frontiers Pediatric Traumatic Brain Injury
 9. Balancing eBooks and Physical Books Library Of Frontiers Pediatric Traumatic Brain Injury
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Library Of Frontiers Pediatric Traumatic Brain Injury
 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
 11. Cultivating a Reading Routine Library Of Frontiers Pediatric Traumatic Brain Injury
 - Setting Reading Goals Library Of Frontiers Pediatric Traumatic Brain Injury
 - Carving Out Dedicated Reading Time
 12. Sourcing Reliable Information of Library Of Frontiers Pediatric Traumatic Brain Injury
 - Fact-Checking eBook Content of Library Of Frontiers Pediatric Traumatic Brain Injury
 - Distinguishing Credible Sources
 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development

- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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