1. Record Nr. UNINA9910639894303321

Titolo	Spaceflight and the central nervous system : clinical and scientific aspects / / edited by Alex P. Michael [and three others]
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2023] ©2023
ISBN	3-031-18440-8
Descrizione fisica	1 online resource (139 pages)
Disciplina	704.94962941
Soggetti	Space flight - Physiological effect
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Intro -- Contents -- 1: History of Spaceflight and the Central Nervous System -- Introduction -- Early Discoveries -- Early Rocket Science -- Early Space Exploration -- The Soviet Union -- The United States -- Early Space Stations -- International Cooperation -- Development of International Organizations -- The International Space Station -- History of Spaceflight Medicine -- Aerospace Medicine Organizations -- Initial Spaceflight Medical Problems -- Long-Duration Spaceflight -- Conclusion -- References -- 2: Cardiovascular Physiology and Fluid Shifts in Space -- The Cardiovascular System on Earth and in Space -- General Concepts of the Circulatory System on Earth and in Space -- Basic Concepts of Blood-Brain Barrier -- Adaptations to Microgravity -- Acute Adaptations and Microgravity-Induced Fluid Shift -- Long-Term Adaptations -- Circulation and the Central Nervous System -- Endothelial Dysfunction -- CSF Hydrodynamics and Brain and Neck Venous Congestion -- CSF Hydrodynamics Circulation on Earth and in Space -- Brain and Neck Venous Congestion -- Space Adaptation Syndrome (SMS) -- Visual Impairment Intracranial Pressure Syndrome -- Integrated Physiologic Countermeasures -- Artificial Gravity -- Lower Body Negative Pressure With and Without Exercise -- Coagulation and LBNP -- Sodium Intake -- References -- 3: Effects of Microgravity and Space Radiation on the Nervous System -- Introduction -- Effects of Microgravity on Neurobiology -- Spaceflight-Induced Intracranial Hypertension -- Space Motion Sickness --

Radiological Changes (Magnetic Resonance Imaging) in Brain Tissue After Microgravity Exposure -- Effects of Microgravity on the Vestibular System -- Effects of Space Radiation on the Nervous System -- Conclusion -- References -- 4: Cognitive Performance and Neuromapping -- Overview -- Cognitive Assessment Approaches. Elemental Cognitive Tasks -- Complex Operationally Relevant Tasks -- Considerations for Cognitive Assessment in Space -- Adaptation to the Spaceflight Environment and Early Cognitive Effects -- Cognition During Long-Duration Spaceflight -- Perceptual and Motor Systems -- Spatial Cognition -- Memory and Learning -- Attention -- Executive and Higher Cognitive Functions -- Cognitive Processing of Emotional Stimuli -- Cognitive Processing of Social Stimuli -- Operationally Relevant Performance -- Cognition upon Return to Earth -- Neuromapping -- Summary -- Potential Positive Effects -- Risk Mitigation Strategies -- Future Directions -- References -- 5: Spine Biomechanics and Pathology -- History of Back Pain and Spinal Injury Associated with Spaceflight -- Comparing Epidemiology of Spaceflight-Related Low Back Pain to Terrestrial Low Back Pain -- Spinal Anatomy Affected by Gravitational Load -- Intervertebral Discs -- Paraspinal Muscles -- Changes in Spinal Biomechanics During and After Spaceflight -- Backpain and Spaceflight -- Pain Pathways for Low Back Pain -- Potential Pain Pathways Associated with Back Pain During Spaceflight -- Other Factors Contributing to Back Pain During Spaceflight -- Pain Pathways Associated with Back Pain Following Spaceflight -- Risk Factors for Spine Injury or Pain -- Associating Symptoms and Pathology Using Imaging -- Treatment Possibilities -- Preflight Surveillance -- Astronaut-Specific Inflight Exercise and Postflight Rehab -- Inflight Spinal Assessment and Intervention -- Clinical Impact of Spine Health in Spaceflight -- References -- 6: Vestibular System -- Introduction -- Vestibular System Anatomy and Physiology -- The Vestibular Labyrinth -- Vestibular Reflex Function -- Central Vestibular Processing -- Vestibular System Compensation -- History of Vestibular System Evaluation in Spaceflight.
Techniques Used to Study the Vestibular System in Microgravity -- Animal Models -- Earth-Bound Models -- Methodology -- Effects of Microgravity on the Vestibular System -- Otolith Function -- Semicircular Canal Function -- Postural Stability and Sensorimotor Responses -- Oculomotor Function -- Other Consideration -- Space Motion Sickness -- Perceptual Changes in Microgravity -- Post-Spaceflight Vestibular Adaptation -- Future Directions -- References -- 7: Intraocular Pressure Considerations -- What Is Spaceflight-Associated Neuro-ocular Syndrome (SANS)? -- Fluid Shifts and SANS -- Intraocular Pressure and SANS -- IOP Conceptual Model: Ocular Pressure-Volume -- Aqueous Humor Dynamics and Regulation of IOP (Fig. 7.2) -- IOP in Relation to Ocular Volume -- IOP and Postural Changes -- IOP and Ocular Perfusion Pressure -- IOP, CSFp, and Translaminar Pressure Difference (TLPD) -- Orbital Pressure and IOP -- Autonomic and Central Regulation of IOP -- Circadian Changes -- IOP Changes in Space -- IOP in Microgravity Models -- Ground-Based Analogs -- Head-Down Tilt (HDT) Bed Rest -- Dry Immersion -- Countermeasures -- Exercise -- Lower Body Negative Pressure (LBNP) -- Artificial Gravity -- Animal Models -- Animal Experiments in Space -- Animal Ground Models -- Non-invasive IOP Measurement and Devices -- Future Directions for In-Flight Studies and Ground studies -- References -- 8: Central Nervous System Neoplasms in Microgravity -- Introduction -- Environment -- Microgravity -- Space Radiations -- CNS Neoplasms Overview --