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A Comprehensive Introduction to Medical Simulation

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Abstract: Simulation tools and techniques have been a part of acquiring medical knowledge and skills for over 4,000 years, with more scientific approaches emerging hand-in-hand with the European Renaissance. These devices were initially used as a means to convey homeopathic experience and the knowledge gained through cadaveric dissection. More recently, the devices have been computerized and restructured according to modern learning theories. This tutorial is a comprehensive overview of medical simulation to include applications that have emerged for COVID response, a brief history, system taxonomies, devices and techniques for representing external and internal anatomy and physiology for medical interventions, the role of team training, criteria for measurement and assessment, specialized military medical applications, and criteria for current simulation accreditation. The tutorial includes constructive models, manikins, part-task trainers, surgical simulators, standardized patients, physical prostheses, team training events, and certifications. These categories are drawn from taxonomies initiated by the American College of Surgeons and the Society for Simulation in Healthcare. The tutorial concludes with a predictive view into the future of the devices and practices as outlined by forward thinkers in the field.

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