INVESTMENTS IN EDUCATION DEVELOPMENT

Biomechanics of nanoparticles self-assembly in lipid bilayer

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Nanoparticles aggregation in lipid bilayer depends on the method of preparation: forming distributed monolayer if prepared by extrusion process or forming hybrid vesicles with nanoparticles segregated into hemispherical domains if prepared by dialysis. The aim of the study was to explain two forms of nanoparticles configuration by assuming changes in biomembrane bending and stretching energy. Monte Carlo simulation of membrane mechanics shows that an energetical barrier exists between condensed and distributed configuration of membrane particles. We propose that two distinct forms of nanoparticles configuration corresponds to two energetically stable states.

Biomechanical comparison of two selected methods of patient handling in rehabilitation and nursing

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The highest risk factor in causing the discomfort and injuries in the locomotor system is transferring patients. According to the rehabilitation and nursing practice, there are several different approaches in the patient lifting and handling. Basically, it is necessary to know the biomechanics, as well as the body mechanics, and later to implement that knowledge into applied ergonomics in the working environment. Biomechanical analyses of two different approaches in sitting to standing (one, when the therapist/nurse is standing at the side of the patient, and the other when the therapist/nurse is standing in front of the patient) has been made, mainly with measurement of pressure distribution (Novel Pedar) in feet and a 3D analysis of differences in gait and posture (QualiSys). The observed factors were “Closer to the load”, “Increase the support base”, “Reduce the centre of gravity according to the load” and “Head position”. Results present differences in the balance, stability and performance of the process between two selected approaches. The approach “Standing at the side” is found to be more appropriate than “Standing in front”. Results support the need of implementation of the program “Methods of handling and lifting with acquired competencies” and the call for use of mechanical lifting, because lifting people is a dangerous manual work.

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