

Title: Effect of the gravity on the sagging breasts of women

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The level of the breast deformation is not related to the fact that the breasts are large or small. For large breasts, it depends if the breasts are very soft (small E, high Δy) or firm (high E, small Δy) (Young's modulus E, vertical displacement Δy) in order that a significant deformation occurs. For small breasts, there is generally no significant deformation. The deformation of the breast increases for very soft breasts and decrements for very firm breasts. Therefore, a good bra of breast can minimize this effect. This paper is related to the respective analysis of the relation of the variables mentioned before by using the equation $\Delta y = \frac{\rho g y^2}{E}$.

Besides, biomechanical models developed using the Finite Element Method (FEM) and programming can be used to model the relationship between different types of tissues (breasts) and with the application of forces or movements to know possible deformations. It can help predict mechanical deformations of the tissue during medical operations and derive and quantify the properties of the breasts with the observed deformations.

The theory of the finite elasticity is used to implement the finite element model. We need to know the biomechanical properties, boundary conditions and a configuration of a normal breast and deformed. It can be very useful when it is done a diagnostic examination (mammography, magnetic resonance) and the patient moves from one position to another and the breasts are compressed. Thus, masses of difficult observation could be visible between those images. It may be possible to have a biomechanical model of the breast. Then, it can be used for breast cancer diagnosis and for studies of the gravity effects on light and heavy breasts and to study the effects of compression on radiographic tests. Furthermore, it is possible to use silicone gel phantom, for breast experimentation. So, the phantom (breast) could be subjected to different weights and analyze the elasticity of the breast to support different forces. It can be done together with the respective simulations. Therefore, we can compare the experimental results (vertical displacements) with the simulations. Then, one could validate the biomechanical model and the simulation program. In addition to the phantom and simulations, we could make a graph of σ (strain) versus ϵ (Δy displacement rate) . Finally, we can get the limit points of yield. As we said before and with these researches, we can design fasterners or other material with the aim that the breast does not reach the limit point of yield.

Biography

Giovanni Alcocer: Independent Researcher, Master in Physics with specialization in Astrophysics and Medical Physics, Professor of Physics, Advanced Mathematics and Science in general. He has various success research projects and books and author of the recognized and renowned articles: The Fundaments of the Mass: Gravitation, Electromagnetism and Atom.

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AJAST
EXCELLENCE THROUGH RESEARCH

Asian Journal of Applied Science and Technology
Volume 4, Issue 3, Pages 167-182, July-September 2020

Effect of the Gravity on the Sagging Breasts of Women

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Crossref

DOI: 10.38177/ajast.2020.4319

Article Received: 11 June 2020 *Article Accepted: 29 August 2020* *Article Published: 30 September 2020*

ABSTRACT

The level of the breast deformation is not related to the fact that the breasts are large or small. For large breasts, it depends if the breasts are very soft (small E, high Δy) or firm (high E, small Δy) (Young's modulus E, vertical displacement Δy) in order that a significant deformation occurs. For small breasts, there is generally no significant deformation. The deformation of the breast increases for very soft breasts and decrements for very firm breasts. Therefore, a good bra of breast can minimize this effect. This paper is related to the respective analysis of the relation of the variables mentioned before by using the equation $\Delta y = \frac{\rho g y^2}{E}$.

Besides, biomechanical models developed using the Finite Element Method (FEM) and programming can be used to model the relationship between different types of tissues (breasts) and with the application of forces or movements to know possible deformations (1 ... .9,11,12,13,15,16). It can help predict mechanical deformations of the tissue during medical operations and derive and quantify the properties of the breasts with the observed deformations (15). The theory of the finite elasticity (10) is used to implement the finite element model. We need to know the biomechanical properties, boundary conditions and a configuration of a normal breast and deformed. It can be very useful when it is done a diagnostic examination (mammography, magnetic resonance) and the patient moves from one position to another and the breasts are compressed. Thus, masses of difficult observation could be visible between those images. It may be possible to have a biomechanical model of the breast. Then, it can be used for breast cancer diagnosis and for studies of the gravity effects on light and heavy breasts and to study the effects of compression on radiographic tests. Furthermore, it is possible to use silicone gel phantom (1), (3), for breast experimentation. So, the phantom (breast) could be subjected to different weights and analyze the elasticity of the breast to support different forces. It can be done together with the respective simulations. Therefore, we can compare the experimental results (vertical displacements) with the simulations. Then, one could validate the biomechanical model and the simulation program. In addition to the phantom and simulations, we could make a graph of σ (strain) versus Є (Δy displacement rate) . Finally, we can get the limit points of yield. As we said before and with these researches, we can design fasterners (17) or other material with the aim that the breast does not reach the limit point of yield.

Keywords: Effect of gravity, Breast deformation, Soft breast, Firm breast, Young´s modulus E, Vertical displacement Δy, Biomechanical model, Fasterners (bra), Silicone phantom, Graph σ versus Є.