**The association of photobiomodulation and low-frequency ultrasound in reduction of localized fat: a study protocol.**

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**Abstract:**

The current routine that includes stress and sedentary lifestyle, alcohol consumption, smoking, poor eating habits and low sleep quality, when combined with genetic factors are directly related to overweight and fat deposits formation. This interferes with self-esteem and quality of life for a large part of the world population. Aesthetic resources destined for localized fat treatment, such as photobiomodulation and low-frequency ultrasound, although seem promising, have low scientific support for the combined use. The aim of this study will be to compare the effects of photobiomodulation, low-frequency ultrasound and the association of these techniques in abdominal localized fat. The main outcome will be abdominal skinfold thickness. Secondary outcomes will include anthropometric parameters, temperature of the treated region, and biochemical and liver enzymatic markers will be evaluated. Visual changes due to treatments will also be assessed through photographic records. Finally, the subjective assessment will be collected through questionnaires that measure quality of life (WHOQOL-BREF), the body self-image scale (BSQ-34) and the degree of patient satisfaction. The mechanism by which photobiomodulation acts in lipolysis is related to the production of reactive oxygen species that interact with the plasma membrane through lipid peroxidation, while low-frequency ultrasound seems to destabilize the membrane due to cavitation. Thus, both are involved on release of triglycerides present in adipocyte deposits for interstitial space, so it is expected that the combination of these techniques will lead to a greater reduction in the abdominal skinfold when compared to the isolated application of each technique.

**Biography:**

Michelle M. Sena is a biomedical who joined as an PhD student in the Postgraduate Program in Biophotonics Applied to Health Sciences at Universidade Nove de Julho (UNINOVE). Prior attending UNINOVE, she was a master’s student in Experimental Pathology at State University of Londrina and obtained a degree in Aesthetic Biomedicine postgraduate course. Her primary research interests are related to the use of photobiomodulation in the treatment of aesthetic dysfunctions, specifically in determination of dosimetric parameters that can be applied in clinical practice. In her free time, she watches series, enjoys exploring the city in the company of her friends and spending time with her family.