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Quantitative evaluation of volumesand functional limitation of upper limb in women with lymphedema related to breast cancer.

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Upper limb lymphedema (ULL) is one of the most side effect of the breast cancer treatments which can lead to motor alterations, causing difficulties and limitations in movements. In clinical practice, the assessment of lymphedema is performed using circumferential method, which is easy to use and low-cost, but not so accurate in the estimation of arm volume. In addition, the functional limitation related to the presence of ULL is not considered at all.The aims of this study are: a) to measure the volume of the upper limb in patients with ULL; b) to define a correlation between upper limb volume and degree of functional limitation. 30 healthy women and 50 patients with ULL were analysed with a Laser Scanner 3D system (LS3D) for the volume detection. Besides this a subgroup of 10 healthy women were analysed with LS3D and with an optoelectronic system for the range of motion evaluationduring upper limb abdo-adduction movements.The volume of the total pathological limb was significantly increased (2.12 dm3 of ULL group vs 1.66 dm3 of healthy group, $p<0.05$) as well as the forearm and upper arm volumes. As concerns upper limb abdo-adduction Range of Motion limitation, a significant correlation was found: the higher is the volume of entire upper limb the lower is the range of motion($r2= -0.59$).In conclusion the results show that the higher the volume of upper limb, the higher functional limitation. These data are useful to demonstrate the functional limitation in ULL patients.

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