

Bioelectrical impedance for monitoring the efficacy of lymphoedema treatment programmes.

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The treatment of lymphoedema includes a combination of massage, compression bandaging, and exercise. To date the most common technique of assessing the efficacy of treatment has involved estimating the total limb volume from circumferential measurements at fixed intervals along the limb.

This study investigated the application of multiple frequency bioelectrical impedance analysis, MFBIA, to monitor the volume of lymphoedema in the upper limb of patients who developed this disorder following surgery for cancer of the breast.

Daily measurements of both circumference and impedance of both the affected and unaffected limbs were recorded for 20 patients throughout their 4 week treatment programmes. Twenty control subjects were also monitored daily over a similar 4 week period. Prior to the commencement of treatment the bioimpedance technique detected a significant ($P < 0.01$) asymmetry between the two limbs of the control subjects, associated with handedness ($P < 0.001$).

Circumferential estimates of limb volumes in the control group detected no asymmetry. Impedance measures of extracellular fluid showed all of the patients to lie outside the 95% confidence interval determined from the data of the control group.

The trends of the impedance measures and the circumferential estimates of volume throughout the 4 week program were found to be significantly different ($P < 0.05$); MFBIA exhibiting a greater sensitivity in the detection of lymphoedema.

The results demonstrate that MFBIA is significantly more sensitive than circumferential measurement both in the early diagnosis of lymphoedema and in monitoring change.