INTRODUCTION/BACKGROUND

Lymphedema with associated arm swelling following surgical and/or radiotherapy for breast cancer is a major complication experienced by about 25-30% of women breast cancer survivors\(^1\). Incidence however does depend on a variety of co-factors and the nature of the primary treatment, with incidence rates of 10\(^{5}\) to over 40\(^5\) for reported mastectomies combined with radiotherapy\(^6\). About 70% of women who will go on to experience lymphedema complications do so within three years of treatment but new cases develop beyond this at about 1% per year\(^7\).

The impact of this chronic condition, which tends to grow worse without treatment\(^8\), is multidimensional and may include loss of self esteem, depression, chronic pain, severe mobility limitations and predisposition to serious limb infections. Therapy, in the form of manual lymph drainage, when used as a part of complete decongestive physiotherapy\(^9\), is useful for some persons to prevent the condition’s progression and in some cases to reverse significant lymphedema already present\(^10\).

Obstacles to successful therapeutic outcomes include the late detection of the condition with late initiation of therapy and the presence of lymphedema that has become hardened to form fibrotic tissue\(^11\). In the latter case, reduction (softening) of fibrotic regions is a needed first step to reduce limb volume and represents a major therapeutic challenge.

Moreover, based on previous measurements\(^12\) and more recent observations\(^13\), one must entertain the possibility that the degree and extent of lymphedema and related tissue hardening may have additional detrimental effects on blood flow and tissue oxygenation.

Thus early detection of sub-clinical or incipient lymphedema may offer a significant advantage with respect to initiation of early therapy and the possible avoidance of some of the problems associated with delayed detection and delayed therapy initiation. It was thus reasoned that assessments of local tissue water differentials between affected and non-affected arms might provide such an early warning method. However, before such an assessment could efficiently be undertaken, the differential of relative tissue water features associated with well established unilateral arm lymphedema needed to be determined.

The Delfin D moisture meter, which registers relative tissue water content \(B=0.978\), is useful when used as a part of complete decongestive physiotherapy\(^4\). The device is simple to use and cost effective. It is easily portable and does not require any special training to operate. It is therefore attractive and suitable for use in the community setting or in the home setting. The potential for our intended goal. We thus elected to use this device in this study. Two of four probes used are pictured in figure 3.

MEASUREMENT METHODS

**REFERENCES:**


**RESULTS**

The relative tissue water, as inferred from the measured relative dielectric constant, decreases as the volume (depth) of tissue included in the measurement is increased (FIG 6). This significant negative correlation is greater for normal tissue but is also present in lymphedematous tissue. Based on the assumed relative content of the underlying tissue, such an inverse dependency is predictable.

**CONCLUSION**

These initial findings suggest that this new method may serve as a rapid quantitative assessment procedure for documenting lymphedema and possibly for early detection of incipient lymphedema that is not yet clinically observable. These aspects are currently under active study and evaluation.

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