INTRODUCTION

Generally, breast cancer tissue is harder than the adjacent normal breast tissue. This property serves as the basis for some examinations, such as palpation, that are currently being used in the clinical assessment of breast abnormalities, as well as for elastography. ***(Garra et al., 2005)***

The principle of elastography is that tissue compression produces strain (displacement) within the tissue and that the strain is smaller in harder tissue than in softer tissue. Therefore, by measuring the tissue strain induced by compression, we can estimate tissue hardness, which may be useful in diagnosing breast cancer ***(Shiina et al., 2004).***

Elastography has been used clinically to examine a variety of breast lesions in patients, and it has been concluded that this modality may be useful for differentiating malignant from benign masses ***(Hughes, 2005).***

During elastography, it is assumed that the main displacement of tissue occurs in the longitudinal direction (i.e., in the direction of the beam). This condition can be largely met by applying compression with a well-controlled stepping motor.

With freehand compression, however, the influence of probe movement on the skin's surface in the lateral direction (so-called creep or slip) must be suppressed ***(Nitta et al., 2006).***

A high-speed algorithm for estimating strain distribution is required for real-time measurement. In addition, an ideal elastography system will have a large dynamic range of strain for stable measurements that does not depend on the speed and extent of compression ***(Yamakawa et al., 2006).***