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## A simple method for acoustic properties determination of cancerous tissue and its implementation into the clinical workflow

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During USCT examination, tissue morphology, as well as acoustic properties such as speed of sound are extracted. Data based upon malignant tissue is limited, so is its reliability as a prognostic factor indicating a malignant or benign nature. It's hard to obtain tumour tissue because of their pathological use for staging. Therefore, this work will present a simple method of acoustic properties measurement and its implementation in a clinical workflow.

## (2) Material and Methods

A broadband –dual immersion technique was used to determine speed of sound and attenuation of malignant and benign Lung Cancer. Tumour were resected during surgery containing Adeno-, Squamous Carcinoma and Benign as well as metastatic tissue from breast and colon carcinoma. Measurements were performed after resection before fixation and histological staining. A clinical workflow was implemented that didn't interfere with the pathological procedures. Additionally, a literature study was performed to compare the determined properties with published data.

## (3) Results

All cancer types had higher speed of sound (1560–1670 m/s) than water. The speed of sound was higher in malignant tissue than in benign. Impedance was highest for squamous carcinoma (1.88 MRayl). Attenuation varied between 0,31–0,8 dB/cm/MHz and showed no significant difference between the histological subtypes. The proposed measurement technique could be implemented into the surgical - pathological workflow without disturbance of the histological management.

## (4) Discussion and Conclusion

There exists comprehensive literature for acoustic properties from parenchymal, but a limited one for cancerous tissue. Measurements revealed that malignant tissue has higher speed of sound than benign tissue and might therefore be a valuable parameter for tissue classification in USCT. More work is demanded in order to determine acoustic properties from mammary tumours of different histological subtypes.

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