

# Elaxto

Elastosonography  
for Thyroid nodules

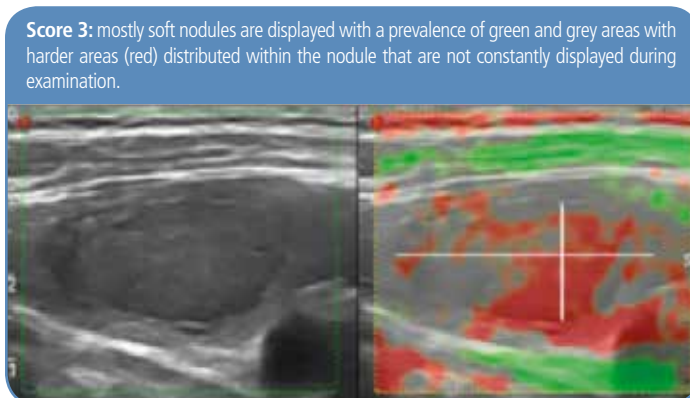
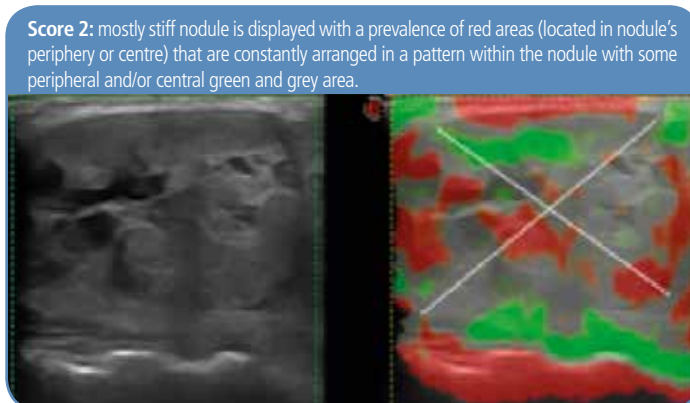
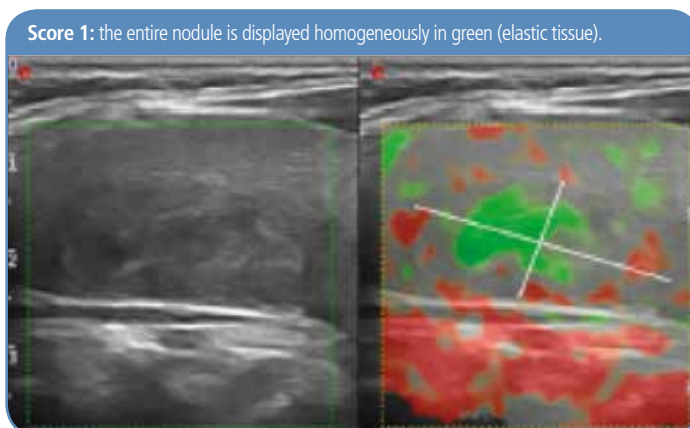
# Elastography, a new dynamic ultrasound technique, reaches high predictive values and might reduce the number of unnecessary biopsies, increase cost savings and improve patients quality of life

Thyroid nodules are a common occurrence in clinical practice, with a 19-67% incidence based on population's age and iodine status. Only 4-7% thyroid nodules are palpable in the general population, which means that most of them are non-palpable, asymptomatic thyroid incidentalomas that are usually detected by ultrasound<sup>1-3</sup>. The majority of thyroid nodules are benign, less than 5% of them being malignant<sup>4-6</sup>. Ultrasound (US) is a useful tool not only to detect thyroid nodules, but also to evaluate and select which nodules to submit to FNAC<sup>6,10-13</sup>. Compared to FNAC, thyroid US offers the advantage of being non invasive and of supplying immediate information. Several US patterns, such as spot microcalcifications, incomplete halo sign, hypoechogenicity and border irregularity, have been associated with malignancy<sup>6,11,13</sup>. Thyroid US however offers poor diagnostic accuracy since it is highly dependent on the operator's skills and shows high specificity with low sensitivity.

Elastography is a newly developed dynamic US technique that measures tissue's distortion level when an external pressure is applied. It is based on the principle that softer tissue sections deform more easily than harder ones, thus allowing to objectively determine tissue consistency<sup>14</sup>. Malignant lesions are often associated with tissue mechanical property changes, which lead to reduced strain values. Tissue's distortion is measured by manually applying gradual pressure with the US transducer or simply through carotid artery's pulsation with images displaying distortion during US examination as a colour coded overlay over the B image.

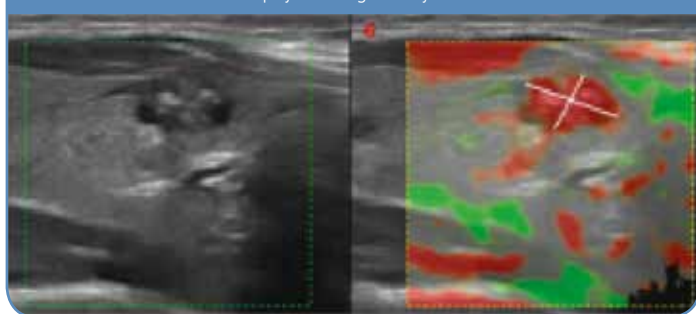
A 4-point scale elasticity score, each corresponding to different degrees of tissue strain (Fig 1), has been recently employed by most authors.

Rago et al. first reported the results of a real-time elastography study in 2007. It involved 92 patients with single nodules that had been selected for surgery where elastography displayed a 97% sensitivity and 100% specificity, regardless of nodule size.<sup>15</sup> Several other Authors have since then reported their own experience.<sup>16-20</sup> In 2010 a meta-analysis involving 8 studies and 639 unselected thyroid nodules was completed aiming to assess elastography's performance and a 92% sensitivity and a 90% specificity was reported for the diagnosis of thyroid malignancy although only 2 of the 8 studies that had been included had a 100% surgical confirmation.<sup>21</sup> Carotid artery pulsation has been proposed as an alternative to free-hand compression since it also shows potential to substantially reduce the number of FNA biopsies.<sup>22</sup>



\* (Carried out with Esaote MyLab70XV Gold ultrasound system)

Score 4: the entire nodule is displayed homogeneously in red.



We recently published our findings regarding a study\* which was performed on a cohort of patients selected for surgery where we compared elastography's findings with final histological diagnosis.<sup>23</sup> The study involved a total of 132 nodules that were scored from 1 to 3 according to decreasing tissue elasticity. All nodules classified as score 1 and 65 of 71 nodules that classified as score 2 (91.5%) were benign at final histology, but 15 of the 49 nodules classified as score 3 or 4 (30.6%) were also benign. Elastography not only showed a highly rewarding diagnostic accuracy, with 85% sensitivity and 83.7% specificity, but, most importantly, reached its highest predictive value by identifying benign nodules (NPV 92.7%). Bearing in mind the bias of the study (i.e. population having already been selected for surgery and the relatively limited number of nodules that were included) this study suggests that nodules displaying a low elastographic score (score 1-2) combined with benign sonographic and clinical criteria may only require US follow-up, thereby reducing the number of nodules that need to be submitted to FNAC.

Rago et al. reported that elastography could be a useful tool for refining presurgical diagnosis in nodules with follicular cytological pattern, thus helping to select the patients for surgery.<sup>24</sup> In this setting, we and others were unable to confirm such high performance of elastosonography<sup>25</sup>; we at any rate agree with Lippolis et al. that the shift from a subjective colorimetric scale to a quantitative analytical tool to assess the stiffness/elasticity of the nodules, avoiding the bias due to the operator skill, could enhance diagnostic accuracy and help to better differentiate benign from neoplastic lesions in patients with follicular patterned nodules.

## Case study, courtesy of:

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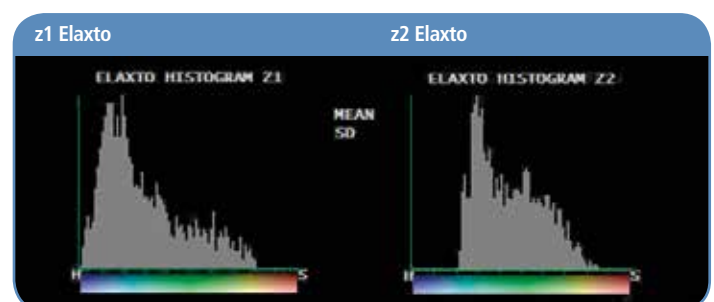
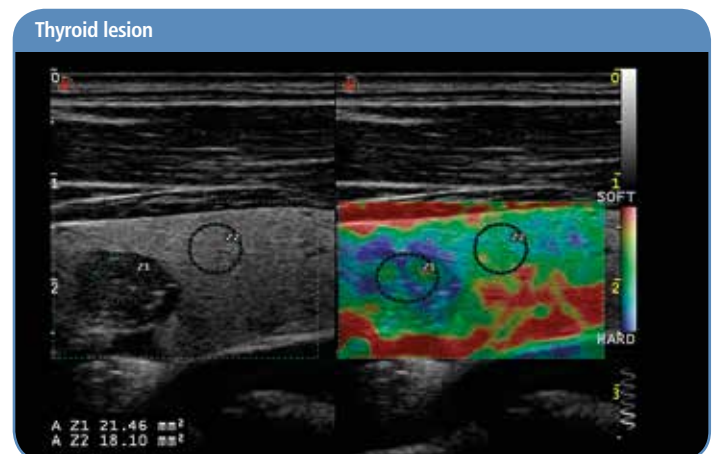
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Elaxto is a non-invasive technique supporting physicians in the assessment of tissue elasticity. Some tissues usually deform less than others when mechanical compression or vibration is applied.

These tissue response differences are detected and displayed in real-time by Elaxto's processing algorithms through different graphic representations that help physicians in their daily clinical routine.

- It supplies additional information to standard B-Mode
- It provides a better definition of lesion area
- It improves Diagnosis and Follow-up

## Quantification and histogram



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 Elaxto measure is not for sale in the USA.*