EP23.01 - Development of a new software for the automatic and non-invasive evaluation of labor progression parameters during contractions.
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Objectives
The measurement of the Delta-Angle of Progression (ΔAoP) and the Delta-Head Perineum Distance (ΔHPD) can objectively detect those cases in which the mother cannot exert efficient pushing efforts, as their variations during the contractions are correlated with the efficiency of maternal pushing. However, the measurements of these parameters through the conventional ultrasound requires specific training. The aim of this study is to demonstrate the feasibility and the effectiveness of an innovative software for the automatic measurements of the ΔAoP and the ΔHPD.

Methods
11 parturients in the second stage of the labor were enrolled. For the purpose of the study, during the contractions transperineal ultrasound acquisitions were assessed longitudinally for the ΔAoP measurement (7 acquisition sessions)(Video 1) and transversely for the ΔHPD measurement (6 acquisition sessions). The performance of the innovative software was evaluated in terms of timing and accuracy, by comparing the outcomes of the automatic elaboration with the measurements performed manually on the same images by an experienced sonographer, who was blinded to the results of the algorithm.

Results
The time needed for the analysis of the transverse acquisitions for the measurement of the ΔHPD was 4 minutes, while 5 minutes were needed for the measurement of the ΔAoP on the longitudinal plane. Each acquisition was automatically elaborated in 30 seconds. The ΔAoP values obtained by the software pointed out a minimum of 6.5° and a maximum of 16.0° (mean: 11.8°±3.6°), while the ΔHPD was in a range between 4.5 mm e 27.6 mm (mean: 15.9±8.9 mm). The corresponding manual measurements showed negligible deviations from these values, as for ΔAoP (range: 7.0°-15.5°; mean: 11.5°±3.3°) as well as for ΔHPD (range: 5.1-26.8 mm; mean: 15.3±8.5 mm).

Conclusions
It is possible to measure the ΔAoP and the ΔHPD automatically and effectively using the Algorithm described above. The software proved to be easy to use and reduced significantly the time required to obtain the results.