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Enhanced method and tools for child thoracic and abdominal compliance  
assessment by clinical treatments observation

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The aim of our study is to obtain realistic values of child thoracic and abdominal compliance. The thoracic and abdominal compliance represents the capacity of deformation under the effect of mechanical solicitation. The dynamic response of the thoracic and abdominal segment is essential because it is one of the main parameters of the whole restraint mechanism in a car child restrain device.

We propose to quantify the thoracic and abdominal compliance in observing thoracic and abdominal manipulations carried out within the framework of usual physiotherapeutic treatments. All the measurements will be done without any contact with the children. Only the displacement of the upper face of the practitioner's hand and the applied load will be recorded. A three dimensional analysis will be performed to reconstruct the displacement.

Furthermore the value distribution as a function of several variables such as age, sex and anthropometrics will be taken into account.

This research will be used to improve the bio-fidelity of the chest and abdomen of child dummies in order to better evaluate the thoracic and abdominal injury risk for children involved in road accidents.

This more realistic prediction of the child injury severity in the case of a collision may have a positive effect on road safety. Indeed, those new data will allow a better evaluation of the current and future restraint systems, for example in the frame of vehicle homologation test procedures as the EuroNCAP.