The movement of the chest walls of rabbits exposed to steep-fronted air shock waves of short duration produced by 50 g spherical charges of TNT were recorded by means of a mechano-electric motion transducer originally developed for this investigation.

The main purpose has been to study the correlation between the deformations of the chest and the damage inflicted to the underlying organs, especially the lungs. The motion parameters, amplitude, velocity and acceleration of the chest wall, were correlated to the physical characteristics of the shock wave found to be highly correlated to the impulse of the incident shock wave. Also, although to a lesser degree, to the maximum amplitude of the inward displacement of the chest wall, on the other hand, was found to be much lower or even uncertain.

The following critical values of the motion parameters were established. If the chest wall receives an impulse load of such a strength and duration that an inward relative movement results with a velocity of more than 15 m sec attained within a period of time of 150-200 microsek i. e. involving accelerations of the order of 10 g, there is a high probability that a severe lung injury will result.

Corresponding maximum amplitudes of the displacement of the chest wall were 5 to 7 mm. The lower limit of effective reflection pressures and impulses causing severe lung injuries were 10 bar and 1,5 gf sec cm-2, respectively. The biomechanical events occurring in the exposed chest are discussed in some detail.