CLAIMS

1. A method for a noninvasive determination and/or monitoring of intracranial compliance of a biological material, comprising the steps of:

a) performing an acoustic spectroscopy of the biological material between a transmitting ultrasound probe and a receiving ultrasound probe, several acoustic transmitting signals of different frequencies being emitted into the biological material and corresponding reflected acoustic receiving signals of different frequencies being received after having passed through the biological material, and the biological material being a human or an animal skull;

b) comparing the acoustic transmitting signals with the corresponding acoustic receiving signals to determine time-of-flight values corresponding to changes in an intracranial pressure (dp);

c) determining an expansion of the biological material (dV), a linear expansion and/or a volume expansion of the biological material being measured;

d) determining an intracranial compliance (dV/dp) of the biological material based on the comparison in step b) and the determination carried out in step c),

wherein the acoustic spectroscopy is carried out in a direction of a frontal plane of a skull above an external ear canal in a position selected to transmit the signal along an acoustic measurement path through a right cerebrum and a left cerebrum, the cerebrospinal fluid (CSF), and ventricles; and

wherein the position further selected to maximize a probability that a full echo transmitted by the transmitting ultrasound is reflected from the opposite skull bone and received at the receiving ultrasound probe; and

e) displaying the time-of-flight values and/or the intracranial compliance.

2. The method according to claim 1, wherein the method additionally comprises the steps of:

f) determining a cerebral blood flow based on the intracranial compliance determined in step d).

3. The method according to claim 2, wherein the method additionally comprises the steps of:

g) displaying the intracranial pressure and the cerebral blood flow.

4. The method according to claim 1, wherein the acoustic transmitting signals are emitted at a first position of the biological material and wherein the acoustic receiving signals are received at a second position of the biological material, and wherein the first position and the second position are identical or disposed opposite each other.

5. The method according to claim 1, wherein the acoustic spectroscopy is carried out in the area of a longitudinal cerebral fissure.

6. A device for a noninvasive determination and/or monitoring of intracranial compliance of a biological material comprising:

a first means for performing an acoustic spectroscopy of the biological material, wherein the first means comprises an acoustic transmitting element for transmitting several acoustic transmitting signals of different frequencies into the biological material and an acoustic receiving element for receiving corresponding reflected and/or transmitted acoustic receiving signals of different frequencies after having passed through the biological material and wherein the biological material is a human or animal skull;

an evaluation unit for comparing the acoustic transmitting signals with the corresponding acoustic receiving signals to determine time-of-flight values;

a second means for determining an expansion of the biological material (dV), wherein the second means comprises a measuring device for measuring a linear expansion and/or a volume expansion of the biological material;

an analysis unit configured to determine an intracranial compliance (dV/dp) of the biological material wherein the acoustic spectroscopy and/or the determination of the expansion of the biological material are carried out in a direction of the frontal plane of a human or animal skull above an external ear canal in a position selected to transmit the signal through a right cerebrum and a left cerebrum, the cerebrospinal fluid (CSF), and ventricles, the position further selected to maximize the probability that a full echo transmitted by the transmitting ultrasound is reflected from the opposite skull bone and received at the receiving ultrasound probe; and

means for displaying the time-of-flight values and/or the intracranial compliance.

7. The device according to claim 6, wherein the analysis unit is configured to determine an intracranial pressure and/or a cerebral blood flow based on an intracranial compliance determined by the analysis unit.

8. The device according to claim 6, further comprising an output unit for displaying a determination carried out by means of the analysis unit.

9. The device according to claim 6, wherein the acoustic transmitting element is disposed at a first position of the biological material and wherein the acoustic receiving element is disposed at a second position of the biological material and wherein the first position and the second position are identical or disposed opposite each other.

10. The device according to claim 6, wherein the acoustic spectroscopy and/or the determination of the expansion of the biological material are carried out in the area of the left cerebrum, the right cerebrum, and a longitudinal cerebral fissure.

11. The device according to claim 6, wherein the first means, the second means, the evaluation unit, the analysis unit and/or the output unit are disposed in one component.

12. The device according to claim 6, wherein the device is realized so as to be rotatable and/or movable.