Supplemental Material

Comparison of average distances in 2D and 3D

In three dimensions, the gap between the centers of gravity of two volumes is given by the Euclidian distance $d = (\Delta x^2 + \Delta y^2 + \Delta z^2)^{1/2}$, where $\Delta x^2, \Delta y^2$ and Δz^2 denote the squared difference between the coordinate components of the two points. Under the simplification that the orientation of any distance vector has the same probability of occurring (i.e. the situation that the two volumes are separated in fronto-occipital direction has the same likelihood as being separated in lateral direction), the average squared coordinate component distance, $\langle \Delta r^2 \rangle$, is $\langle \Delta r^2 \rangle = \langle \Delta x^2 \rangle = \langle \Delta y^2 \rangle = \langle \Delta z^2 \rangle$ for any given average distance *d*. Therefore, the average Euclidian distance between the same, large set of points measured in three dimensions is $d_{3D} = (3\langle \Delta r^2 \rangle)^{1/2}$ and $d_{2D} = (2\langle \Delta r^2 \rangle)^{1/2}$ in case of two evaluated dimensions. Therefore, the average distances d_{2D} and d_{3D} computed from 2D and 3D data, respectively, are compared by using the rough estimation $d_{3D} = d_{2D}\sqrt{3/2}$ (=22%). Obtained from cases with $D < 0.5$ of the current study, the average distance $d_{3D} = 10 \pm 7$ mm corresponds to $d_{2D} = 8.2 \pm 5.7$ mm which is in the range of the previously reported value $d = 13.5 \pm 5.3$ mm.