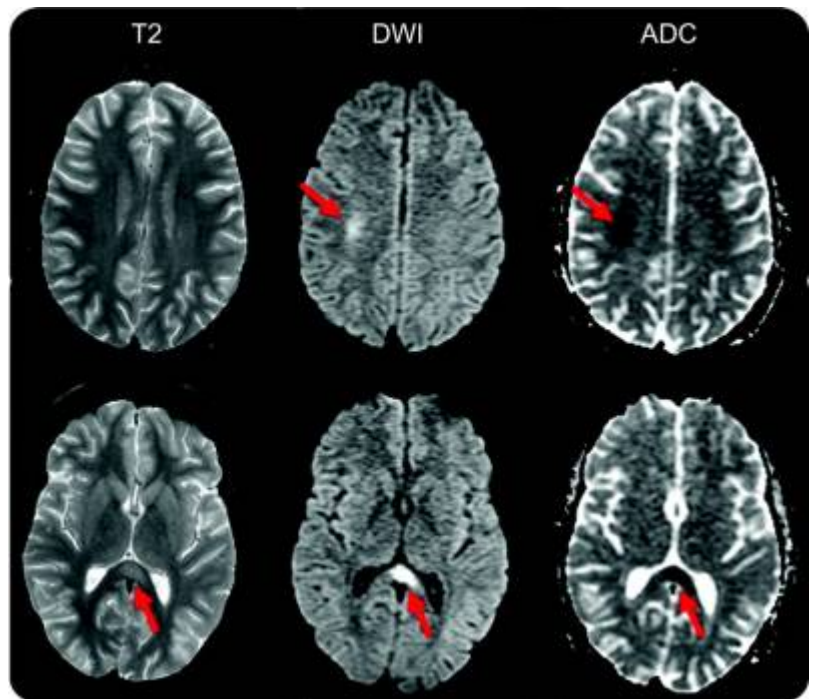


Apparent diffusion coefficient (ADC)

Measures the magnitude of [diffusion](#) (of [water molecules](#)) within [tissue](#) ¹⁾.



It is commonly clinically calculated using [MRI](#) with [diffusion weighted imaging](#) (DWI).

DWI exploits the random motion of water molecules. The extent of tissue cellularity and the presence of intact cell membrane help determine the [impedance](#) of water molecule diffusion. This impedance of water molecules diffusion can be quantitatively assessed using the apparent diffusion coefficient (ADC) value.

Measurement

ADC values are calculated automatically by the software and then displayed as a [parametric mapping](#) that reflects the degree of diffusion of water molecules through different tissues. Then, by use of a dedicated workstation, ADC measurements are recorded for a given region by drawing regions of interest ([ROIs](#)) on the ADC map.

An ADC of a tissue is expressed in units of mm²/s. There is no unanimity regarding the boundaries of the range of normal diffusion, but ADC values less than 1.0 to 1.1 x 10⁻³ mm²/s (or 1000-1100 x 10⁻⁶ mm²/s) are generally acknowledged in adults as indicating restriction. However, this is entirely dependent on the organ being imaged and the pathology.

Some rough useful values (10⁻⁶ mm²/s) 8-10:

white matter: 670-800

cortical grey matter: 800-1000

deep grey matter: 700-850

CSF: 3000-3400

astrocytoma

Gd II: 1273 ± 293

Gd III: 1067 ± 276

Gd IV: 745 ± 135

Diffusion changes are correlated to the clinical deficit and are potentially useful for early diagnosis and longitudinal evaluation, especially in the context of pharmacological trials.

Apparent diffusion coefficient in glioma

see [Apparent diffusion coefficient in glioma](#).

Apparent diffusion coefficient in medulloblastoma

see [Apparent diffusion coefficient in medulloblastoma](#).

Apparent diffusion coefficient in metastases

see [Apparent diffusion coefficient in metastases](#).

Apparent diffusion coefficient in meningioma

see [Apparent diffusion coefficient in meningioma](#).

Apparent diffusion coefficient in hydrocephalus

see [Apparent diffusion coefficient in Hydrocephalus](#).

Apparent diffusion coefficient in vestibular schwannoma

see [Apparent diffusion coefficient in vestibular schwannoma](#).

1)

Sener RN. Diffusion MRI: apparent diffusion coefficient (ADC) values in the normal brain and a classification of brain disorders based on ADC values. Comput Med Imaging Graph. 2001;25 (4): 299-326.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=apparent_diffusion_coefficient

Last update: **2024/06/07 02:53**

