

MRI of vowel articulation

This demo provides links to QuickTime movies of the vocal tract configuration for the three point vowels of German /i/, /u/ and /a/. Each vowel is shown in three different volume orientations: sagittal, coronal and axial (transversal).

Notes on the MRI images:

Bone (including teeth) is hardly distinguishable from air (black). High intensity parts of the images (shades of red) generally correspond to fatty tissue (including bone marrow). Muscular tissue is generally at an intermediate intensity level (shades of green and yellow).

Links to the nine films are given here. See below for explanatory material.

i sagittal

i coronal

i axial

u sagittal

u coronal

u axial

a sagittal

a coronal

a axial

Points to look out for:

Although /a/ is described as an open vowel, it is important to realize that this applies to the mouth opening, whereas in the pharyngeal region the vocal tract can be very strongly constricted. This can be seen very well in the axial images.

Although /u/ is described as a back vowel (like /a/), note that the lower pharynx is very wide, as in /i/ (best seen in the sagittal images).

Note the grooving in the back of the tongue for /i/ (observable in the axial images). This can be attributed to the action of the posterior genioglossus (whose fibres are mostly close to the midline), pulling the back of the tongue forwards and causing the front of the tongue to bunch upwards.