

Using the Articulatory IPA charts

Introduction

These charts are a phonetics teaching resource containing ultrasound tongue imaging (UTI) and magnetic resonance imaging (MRI) videos of International Phonetic Association (IPA) speech sounds produced by two trained phoneticians; [Janet Beck](#) and [John Esling](#). Clicking on the symbols on each chart will open up a video popup showing the movements of the tongue during speech production.

To see how UTI and MRI relate to one another, click [here](#).

For more information on how to use these charts, please see below.

1.1 The charts

Table 1: IPA charts that are available on this website, including information on speaker, speed and recording method - ultrasound tongue imaging (UTI) or magnetic resonance imaging (MRI)

	Janet Beck	Janet Beck	Janet Beck	John Esling	John Esling
Recording type	UTI	UTI	MRI	UTI	UTI
Speed	normal speed	half speed	normal speed	normal speed	half speed
Pulmonic consonants	✓	✓	incomplete	✓ default chart	✓
Nonpulmonic consonants	✓	✓	incomplete	✓	✓
Other symbols	✓	✓	incomplete	✓	✓
Vowels	✓	✓	incomplete	✓	✓

Use the dropdown menus on the upper left of the screen to navigate between charts, see Figure 1.



Figure 1: Three dropdown menus allowing IPA chart selection

Click on a symbol to open the articulatory video as a pop-up window, see Figure 2 left and right, then click on the play symbol to play the video and view the articulatory movement.

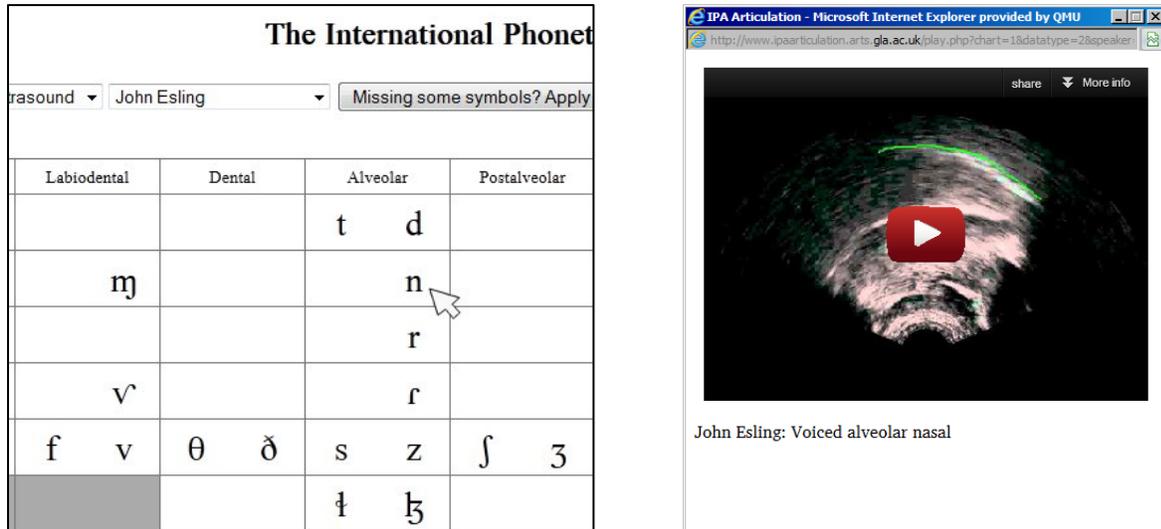


Figure 2: (Left) Single-clicking on an IPA symbol to open the associated video as a pop-up window. (Right) The pop-up window video file ready to play.

1.2 Interpreting the ultrasound video

Ultrasound tongue imaging shows the outline of the surface of the tongue, but usually does not reveal other structures in the vocal tract.

In a midsagittal (i.e. in profile orientation) ultrasound tongue video, the root of the tongue and the pharynx are on the left-hand side and the tip of the tongue is on the right-hand side, as shown in Figure 3, left.

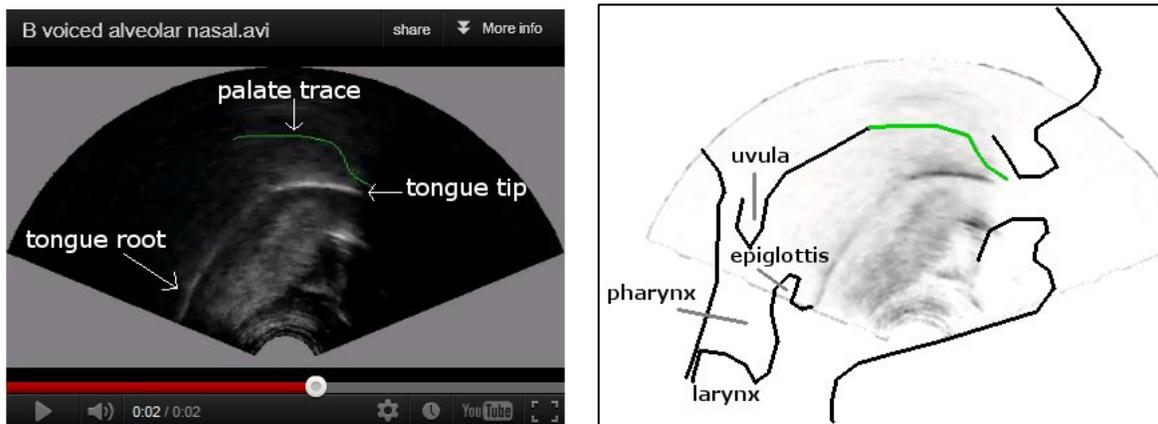


Figure 3: (Left) A UTI video still frame of an [n] articulation with the tongue root and tip labeled and the palate trace labeled. (Right) Showing how the video still frame is located within the vocal tract. The outline of other vocal tract parts were obtained by tracing over a midsagittal MRI image of the same speaker during the production of an [n].

The green line above the tongue surface, shown on each ultrasound video (see also Figure 3, left), shows the location of the hard palate and alveolar ridge. The hard palate is not normally visible during ultrasound tongue imaging, but can be identified over several video frames when the speaker swallows liquid. A spline can therefore be fitted to the hard palate and acts as a reference point. The spline generally does not extend to the soft palate, which is mobile and usually in a raised position during a swallowing action. Figure 3, right, shows the location of the palate trace and tongue surface, obtained through ultrasound tongue imaging, in the vocal tract.

1.3 Midsagittal and Coronal orientation

Some videos in the charts show the tongue in two orientations: midsagittal and coronal. Midsagittal orientation is always presented first. The current recording setup does not permit recording in midsagittal and coronal orientation at the same time, the midsagittal and coronal videos are of two separate articulations of the same speech sound. A label at the bottom of the video shows which orientation is being presented. Midsagittal orientation shows the tongue in profile orientation with the tongue tip to the right of the screen. Coronal orientation is the view of a section of the tongue's surface if you were looking face-on at the speaker.

The videos that contain coronal-orientation recordings are mainly lateral articulations and sibilant fricatives [s] and [ʃ], in order that the tongue-rim lowering that is typical of lateral articulations can be observed, and the midline grooving of the tongue for the sibilant fricatives. Other consonantal and vowel articulations are presented only in midsagittal orientation.



Figure 4: (Left) A still frame of a [ʃ] production in midsagittal orientation. (Right) Later on in the same video, a still frame of a [ʃ] production in coronal orientation, showing central grooving down the midline of the tongue.