Language and Mind
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Module - 03
Lecture - 11
Places and Manners of Articulation Consonants

We will move on with our discussions on mechanism of sound production. We have seen how the flow of inhaling air is responsible for various things in human body. But, the flow of exhaling air is what is responsible for sounds of human language. We discussed whole mechanism of sound production vis a vis vowel sounds last time. Today, we are going to look at consonant sounds and what involves in production of consonants, we will examine that.

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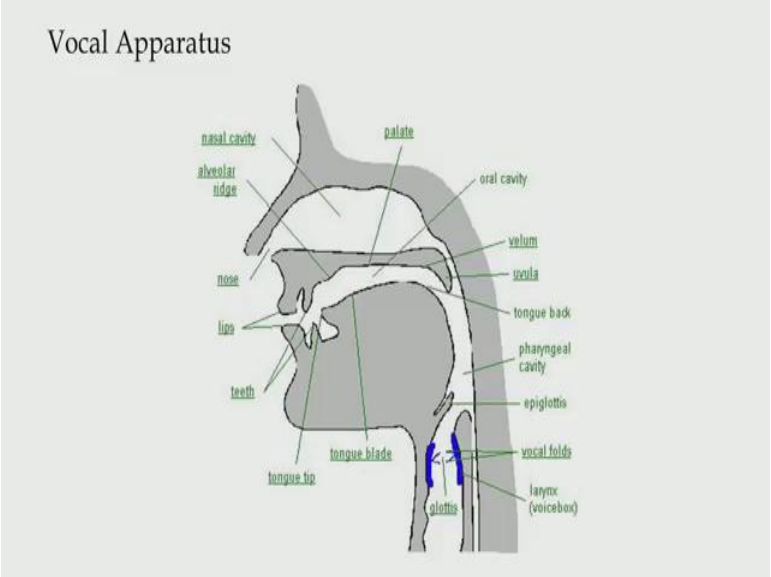

Let us keep again this picture in mind and two parts of this picture - oral cavity and nasal cavity. These are the two things that we need to keep in mind and most of the names that you see around it, they are the names of different places involved in articulation of sounds and mostly consonants. So, we will again start and see how the production of consonant sounds work. And since we are talking about both oral cavity and nasal cavity and now we are going to be talking about consonants …

Right in the beginning I want to mention that we are going to see two types of consonants and they are going to be oral consonants and nasal consonants. So, the places of articulation of consonants are going to be located in oral cavity, but some of them are going to be nasal consonants as well. And I will, right in the beginning I will explain why they are called nasal consonants and what happens for which we call them nasal consonants.

So, it is very interesting and I am sure you have noticed something like this before, but I want to draw your attention to this thing. Now, look at the flow of air. The flow of air starts from here through glottis, and then it moves in this passage. You see this part at the beginning of oral and nasal cavity? This is called uvula. If you open your mouth wide enough in front of a mirror, in fact you can see that; it is a little thing hanging from the roof of the mouth.

What happens? In the production of oral sounds, this uvula every time is raised. You see what would happen if it is raised? The passage to the nasal cavity would block; thus no flow of air through nasal cavity. In other words, the flow of air is straight through oral cavity and we get oral sounds. If it is lowered, then it opens up a passage in the nasal cavity and part of flow of air move through nasal cavity and in such cases, situations, we get some nasal sounds.

So, the distinction between oral sounds and nasal sounds is this, and uvula is responsible for that distinction in directing the flow of air through either completely oral cavity or partially through nasal cavity as well. So, now, let us look at some more sounds and some of the places of articulations with respect to consonants.

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	Oral Sounds				*Nasal Sounds*
	-asp -voice	+asp -voice	-asp +voice	+asp +voice	
Velar	k	kh	g	gh	ng
Palatal	c	ch	j	jh	ny
Retroflex	T	Th	D	Dh	N
Dental	t	th	d	dh	n
Labial	p	ph	b	bh	m

And here is another chart which will be very useful for you. We want to spend a minute of two with this chart, and then we will go back to the picture that we have just looked at, once again. See the sounds; I am sure you have heard these sounds before; I only want your attention to these sounds in a systematic way for you to understand, what is involved in production of these sounds.

And take it as a note right here; the discussion of these sounds are not for you to learn sounds. We are discussing these sounds here for us to see… We are looking at what is involved in production of these sounds, for us to understand how a child while learning language or how the human mind at that stage, earlier stage in a child, begins decoding these things. Unless these things are specified and decoding is very difficult. And we have also looked at, we have also got this, only after decoding.

This was done long time ago by a Sanskrit Grammarian named Panini. That happened at a time when we did not have sophisticated machines. We did not have computers; we did not even have printing, papers and press, ink, all of these things were discussed with students and developed orally.

So, this is not something new, but for us to discuss these things.. and such a discussion is going to give us an understanding of sound production mechanism for us to understand decoding of underlying rules; that is, in this case, decoding of underlying places of

articulations and manners of articulations and its specific features of sounds which together combine to make words, and then sentences and then language.

So, we will build up these things, but first let us understand how these sounds are specified in a specific way. So, let us take examples of consonants like ka and cha and let us say ta or pa. We are taking only four: ka, cha, ta and pa. I am in particular taking these examples because most of the Indian languages, most of the languages spoken in the subcontinent would have these sounds. So, it would not be very difficult for you to figure out their places of articulations.

And in this chart you see the place of articulation for ka is… what is, the sound ka is called a velar sound, cha is called a palatal sound, ta is called a dental sound and pa is called a labial sound. So, the places of articulation for these things is, keep this thing, these four sounds in mind; ka, cha, ta and pa that are velar, palatal, dental and labial and let us see this picture again.

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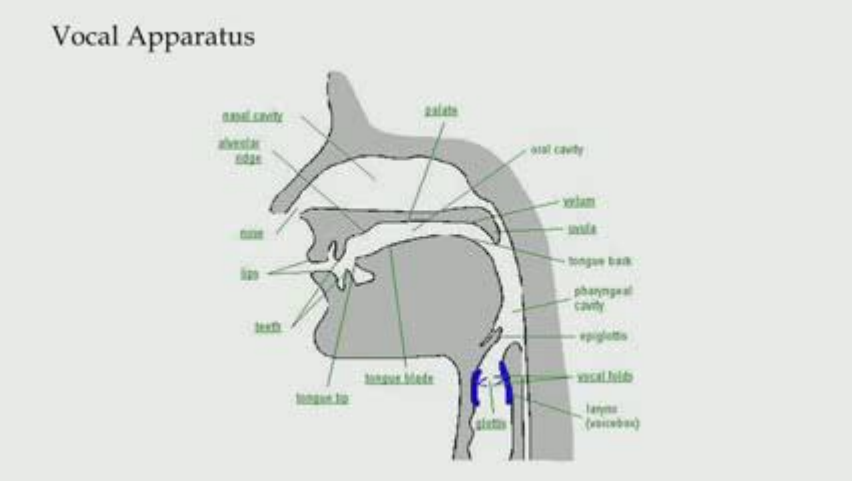

The place of articulation for ka is this – velum; therefore, this sound is called velar sound and you can verify this when you say a sound like ka, ka. When you say a sound like cha, cha you can see that we are moving ahead. You can see that we are moving ahead in the oral cavity and the place of articulation is somewhere here in the middle which is known as palate and therefore, this sound is called palatal sound.

For ta, say it again for yourself and see whether what I am saying is true or not. With the help of this picture, I am trying to explain this to you that the place of articulation for ta

is this tip of the tongue comes in the middle of the two teeth, upper teeth and lower teeth. And therefore, this sound is called dental sound and again for pa, we see the place of articulation is lip pa, pa. So, therefore, it is called labial sounds; and in particular, if you want to be more specific, such a sound in languages of south Asian subcontinent and in many other languages as well, is called bilabial sound, because we cannot possibly say a sound like pa without the help of both the lips coming together - pa. So these are the places of articulations in the oral cavity for the four sounds that we have just discussed.

Now, let me take you to two more sounds: one that is there on this picture, that is there in this chart and the other which is one that is here in this picture and the other that is not there in this slide. One is Ta; we call it a retroflex sound and it is also important for us to know that retroflex sounds is, in particular, features, a particular feature of languages of South Asian subcontinent and particularly Dravidian languages.

It has been established through Dravidian languages, retroflex sounds went to other families of languages spoken in the subcontinent, like Indo-Aryan languages like Hindi and Punjabi and Odiya or Bengali, Munda languages, the Tibeto- Burman languages, or for that matter, Andamanese languages.

There are five different language families; that is, languages from five different distinct language families that is spoken in this subcontinent, we have not discusses that. But, since I mentioned Dravidian languages, it is imperative for me to mention these four names as well. And what I am trying to say is retroflex sounds are particular feature of the Dravidian languages and after Indo-Aryan, Munda, Tibeto-Burman and Andamanese came in contact with Dravidian languages, they received retroflex sounds.

So, what do we mean by retroflex sounds? Let us look at this picture again ((Refer Time: 14:10)). What is the place of articulation for these retroflex sounds and what is the mechanism involved in that? It is important for us to understand, because this sound is specific to our languages. See, this is how it works. Here we have teeth and beyond this and before we reach palatal area, we have something called alveolar ridge. Alveolar ridge is basically a place where… a place a little bit higher, where the upper teeth are in-fixed in our muscular gum.

So, the tip of the tongue curls back and flaps this region, alveolar ridge and therefore, we get the sounds like Ta or Tha, Da, Dha - all of them, all of these sounds we get through

this process and we get it from this area. With the process that tip of the tongue goes all the way to the alveolar ridge and hits it backward, curls first and then hits back alveolar ridge. And therefore, we get retroflex sounds. As you can see the process itself is difficult. So, it is not available in many languages of the world; this sound is particularly going to be one which will distinguish our languages from many other languages of the world.

And to take an example this sound is not available in English. It might be available in the English that we speak; we speak English spoken in India. Therefore, in our English this sound is possible and it is scientific that this sound be possible in the English that we speak. But, English spoken in many parts of the world would not have this sound. So, at this point it is also important for us to understand one more sound and that will particularly distinguish English spoken in other parts of the world and English spoken in India and other languages spoken in India.

So, let us take a word from English like, table. The word table has a sound ta, ta; and that does not seem to be retroflex sound. However, our sounds ta, when we speak English, that is our English in India, we say Table and then we do have a sound like Ta which is clearly a retroflex sound. But, in other parts, English spoken in other parts of the world, will not use retroflex sound here; they will use the ta, would sound different.

One way to put it is, that is lighter than retroflex sound. What does it mean in terms of places of articulation? The tip of the tongue goes not all the way to alveolar ridge, but to the alveolar region. Just before the… just slightly above the teeth and therefore, that sound is called just alveolar sound. So, this sound ta in a word like table, in a word like truck, in a word like taxi - in English spoken in other parts of the world is alveolar; whereas the Ta, Ta spoken in our languages is retroflex and that is the distinction which is very significant for us to understand.

So clearly you see, in this chart we do not have alveolar sounds which means, the number of sounds that you see here in this chart, we do not have only these many sounds in natural language; we have more sounds. These many sounds are specifically available in many languages of the world of course, but most of the languages that are spoken in South Asian subcontinent; therefore, I have picked up these sounds.

And I have only used five different places of articulations here for us to understand. But, as you saw, alveolar is another one and then there are going to be more places in oral tract which are responsible for more sounds in many other languages that may or may not be available in lot of our languages.

So, we need to look at the same chart with the other dimension; we need to look at more sounds that are available here. So far we have seen, if we need to conclude that, so far we have seen places of articulations of these sounds. Now, and they are according to the vertical axis; arrangement of these sounds is according to the places of articulation. Now, you are going to look at this whole chart horizontally and then we want to see how these sounds are different from one another and the difference horizontally, the difference between these sounds, is according to their manners of articulations. So, let us start and see. The broad distinction that you see here - that four of them like ka, kha, ga, and gha - these are oral sounds and the last one is a nasal sound.

Remember, our distinction between oral cavity and nasal cavity? For the production of nasal sounds ng ((Refer Time: 21:15)) the uvula is lowered for the flow of air through nasal cavity and we get this sound which is nasal sound. In other words, this is velar nasal. The place of articulation is still velum and we get a velar nasal. Similarly, for a palatal sound also we can get a palatal nasal; for retroflex we can get a retroflex nasal, for dental we can get a dental nasal and bilabials, we can also get bilabial nasal. That is how this chart is responsible for us to understand the broad distinction between oral and nasal sounds.

Now, let us focus on oral sounds. The distinction between ka and kha is in terms of aspiration, this h marks aspiration which simply means little bit extra flow of air. So, see the distinction. When we say ka, the flow of air is stopped, obstructed, at velum which is the place of articulation. But, with kha the place of articulation is still velum, but there is little bit extra flow of air – kha. Similarly c, ch, T, Th, t, tha p and ph.

So, these sounds are distinct from one another with respect to extra flow of air and not extra flow of air. There is another part, which another thing, which is responsible for further distinction. So, we are done with the distinction between ka and kha; then the question is, how do we make the distinction between ka and ga? And once we establish

the distinction between ka and ga, probably it will be easier for us to see the distinction between ga and kha, because the distinction between ga and kha is again only aspiration.

So, look at the first thing here. ka is marked as minus aspiration and kha is marked as plus aspiration. So, ka is not aspirated, kha is aspirated. Similarly, ga is not aspirated and gha is aspirated. That sounds OK and that helps, but what is the distinction between ka and ga? And then, we see in the second line - voice. So, the voicing is what is responsible for the distinction between ka and ga. ka is again not voiced, minus voice, and ga is voiced. So, again kha was not voiced and gha is voiced.

So, the two, a combination of these two features, like aspiration and voicing, is going to give us the distinction between all these sounds. So, if I am talking about a palatal non aspirated and non voice sound, it is just going to be one sound which is cha. If I am going to be taking about, let us say, labial plus aspirated plus voiced, there is going to be just one sound, which is pha. So, a combination of these two features is playing a nice role in giving these sounds distinctive identities.

This is nice. But we need to understand what voicing means and here is what you mean by voicing. We will need to go to the picture again that we had seen before. Let us look at this picture and then you will see, you see here vocal folds? Vocal folds is located in larynx, the voice box, and it vibrates; sometimes it does, something it does more and sometimes it does not. Such a vibration yields voicing and that is why some sounds like ga, when you say ga, you can observe voice, vibration of vocal folds which is also called vocal chords and then we get a sound like ga.

So, when we say ga, we have vibration and then it is not aspirated and the place of articulation is velar. So, this is what we mean. So particularly with this explanation I want you to understand what voicing means and then you can see, if you understand voicing now and if you understand aspiration, then the two things put together gives us distinctive features for each one of these sounds from different places of articulations. This is also called articulatory phonetics.

But, without getting into technical jargons I want you to understand these sounds on the basis of their places of articulations and manners of articulations, for their distinct identities. And then see how we learn these sounds. Please note that we learn these sounds without any effort nobody teaches us these sounds. Take a moment and think

about this. When we go to schools; that is, when a child goes to schools, a child is already equipped with these sounds; a child is already equipped with much more than these sounds. We will see one by one what a child is equipped with before we start teaching a child.

So, the question is how did the child learn these things? If a child learnt to say ka, imitation would not have helped the child, because velum as you have seen in the picture is way too low, way too back in the oral cavity. It is not possible for a child to see velum. I mean, it is possible to see movement of lips. So, if we can argue about learning on the basis of imitation, learning on the basis of observing others, we can see look, I can see how pa sound comes.

When I see both the lips coming together I get the sound pa, but what explains the distinction between pa and pha, pa and ba and pha and bha? A child, without any effort, within no time, learns these sounds and it is not just that they learn these sounds in isolation, they learn these sounds, they also learn how to combine these sounds too big to make words, before we know.

So, the argument here is there is something much faster… the process of learning is much faster. This is taking place all the time in human mind and this is what we have been meaning, since we started talking about the role of input: limited input and too huge output. So, what a child actually uncovers and figures out is the specific features of these sounds and specific places of articulations involved to be able to say these sounds. This is also called conditioning of vocal tract. This remains active; this happens in early years; it probably happens before 8, 9 or 10 years of age.

Therefore, after 10 years or 13 years in particular, if we try to learn something new, we have to depend on the conditioning of our vocal tract that happened while learning a language we learned, before the age of the 30. Now, there are... So, let us understand this thing carefully. Conditioning of vocal tract happens early in this stage. It starts very early and then probably it continues until the age of 12 or 13. That is also the time to which access to universal grammar is available to learners. These two things put together and the limit to 12, 13 years of age is known as critical period and this whole thing is put under the title Critical Period Hypothesis.

So, things that we learned before that from the perspective of universal grammar, we have direct access to that and since the conditioning of vocal tract is still on, we learn effortlessly. Anything that we learnt beyond that, they tend to start weakening, they tend to take more time. Because, the access to universal grammar has started weakening and the conditioning of vocal tract is done. So, if we learn a language after 13 years of the time, I am going to still sound the way I would be speaking my first language.

Therefore, it is important for us to understand that anything that we learn before 13 years of age, is what is called first language, is what is called mother tongue. So, the term first language is little bit critical, little bit tricky. We could have learned more than one language before 13 years of age, but they are all our mother tongue, they all could be called first language; or if we can use little bit ungrammatical term, first languages. Things that we learn after the critical period are called second languages; second language or second languages. That is the distinction between first language and mother tongue.

This is how first language and mother tongue mean the same thing and second language is different from first language on the basis of this. So, the conditioning of vocal tract is important for us to understand and it also helps us understand how a child actually uncovers specific places of articulations and specific features relating to manners of articulations,. We do not teach a child the way we have explained these things to you; no child learns language this way. This is only for us to see how they learn; this is for us to understand. But, this and… since it does not happen this way, we say it happens effortlessly; it happens without instruction and therefore, a huge role of human mind in it. We will continue looking at it more. Thank you.