Applied Linguistics
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Lecture 5
Vocal Apparatus

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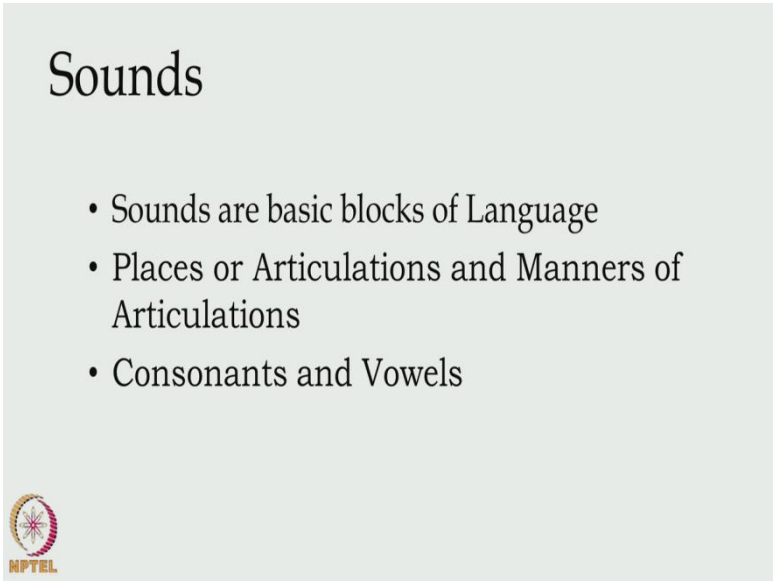

We will continue looking at sounds, which we have seen last time little bit, right. We started with the idea that sounds are basic blocks of language, right. Remember, there are there are not infinite sounds in any language. Set of sound in any language is limited in numbers. Also, all the languages share sounds, some would share more and some would share less, nonetheless there are distinct patterns, distinct sounds in every language.

There may be distinct sounds in every language, okay. And then we will begin looking at places of articulation and manners of articulation today again. And mostly we will be talking about places of articulation is of consonants today and we have looked at the distinctions between consonants and vowels, right very quickly.

"Professor- Student conversation starts"

What will be the most significant distinction between a consonant sound and a vowel sound, anybody?

Obstructions (())(01:55)

Obstruction of airflow, obstruction of exhaling flow of air in the oral cavity.

“Professor – student conversation ends”

If it is obstructed at a different point in different ways that is, at different places of articulation and with different manners of articulations, then they become consonant sounds. However, if there are, there is very little obstruction and the flow is not totally obstructed, then they are vowel sounds.

Vowel sounds are fundamental to words, to the to the process of word formation because we see empirical evidence across languages without a vowel sound, which tells us vowels are vowel sounds are fundamental to language, okay. So let us look at some of more places of articulations. We will keep coming back to this picture several times.

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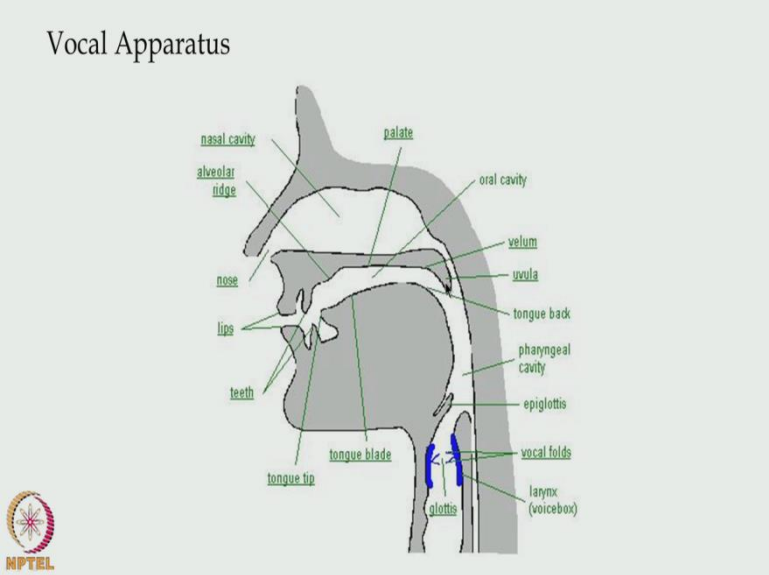

I do suggest you to take a look at this picture very carefully when you are looking at it in your on your machines as well, okay. In this picture we have seen that there are 2 important places to begin with, one is nasal cavity, the other is oral cavity and this, this place uvula is one very crucial organ, which is responsible for nasal quality of sounds in the sense that if the air if air flow is allowed to move through this cavity.

Then we get nasal quality in sounds, if it if uvula is raised and this nasal passage is closed, then we get only oral sounds, all right. And then we come to other places of articulation where the important ones are going to be… Look at this; this is the place this place, which is called a velum. You see this place, this is called pallet. Then things like these, which are teeth and then lips, okay.

And then right close to teeth you see what we know as alveolar ridge. Do you see alveolar ridge here? Then this is in the oral cavity, we have this line as we say tongue. This is the back of tongue; this will be the tip of the tongue, all right. So I am only drawing your attention to some of these places which are going to be responsible for a large number of sounds again. 1 one more thing which you should look at is this.

You see this thing, this is called glottis and vocal cords are located here, right.

"Professor- Student conversation starts"

Anybody plays any musical instrument?

Student:

Yes

Professor:

How do you get sound out of musical instruments?

Student:

Vibration.

Professor:

Vibration of what?

Student:

String.

"Professor – student conversation ends"

So there are there are strings in some of the or many of them and when you try to vibrate them in variety of ways, then you get different combination of sounds, that is all I can say about them. And that is that is visible, you can you can see people doing that and then there is underlying system bind that, those who know how to do it well, they come up with more combination of sounds.

So look at this, there is there are vocal cords located here in the in the glottis. So these are these are going to be important places for us to look at. Did we see vowel sound last time? What we see very crucial to refresh is there are only 3 places of articulations that is, we have divided the entire oral cavity in into 3 parts; one is back, mid and front. The reason why it has been divided only in 3 parts is because obstruction of sound is very minimum, okay.

So for the back vowel, whatever little obstruction that you see is in the back of the oral cavity, for mid vowels the little bit of obstruction that you will see is in the in that part. And then for front vowels like "oh" and "ooh", you see being some sort of obstructions in the front. We have seen according to manners of articulations, there are 2 of them, one is a short vowel and the other is long.

We started talking about vowels when I had asked you questions about how many vowels are there in English remember, we had seen there are 5 vowels and then we talked about them a lot. And we also we also talked that there is nothing called as "A for Apple", remember those things. Now besides that, now is now is the time to look at it more carefully, where the distinction between 'a' a vowel sound 'a' and 'aa' is only in terms of duration of duration of the sound. And that duration is also relative duration, which is if 'aa' is longer, then 'a' has to be shorter than that, okay 'e' if it is longer, then short one has to be shorter than that.

So there is no time defined for these shorts and long vowels and this duration is relative, all right. And they have been very carefully classified in the classified in the studies of these sounds, short long short long and short or long all 3 back vowel, mid vowel and front vowels have their 3 longer counterparts. And then there are there are more vowels, I I told you last time that this classification was done long time ago. That was around 2500BC by grammarian Panini who had studied these things.

"Professor- Student conversation starts"

Does anyone know where he lived, where he studied these things? Last time I remember somebody was telling me about Panini somebody, you okay, so do you know where he I mean, this is not just for him, anybody can answer this question. Do you know where he lived, very did these things?

No.

“Professor – student conversation ends”

That is not very crucial for what we are discussing, but it is important to locate it in time in history time and place particularly um. He studied in the ranges of Hindukush mountains, which are now parts of Northwestern Pakistan or Afghanistan, the idea is probably, he studied these things at Takshishila, okay or around that that area.

Another important part is, in these many years 2500 years, studies after studies of sound system and anything that we know today in modern science about sounds; such studies have not contradicted anything that he was talking about. And I think, I remember now when last time we before we stop last time I told you that, these sounds are unique sounds in the sense that they are part of all the languages all the languages.

The languages that were there during time during Panini’s time or may not be now or the languages that we have today or may not have been around during time of Panini. Two crucial examples I I two crucial examples are Hindi and English and many other languages that that we speak. Get this thing? All right.

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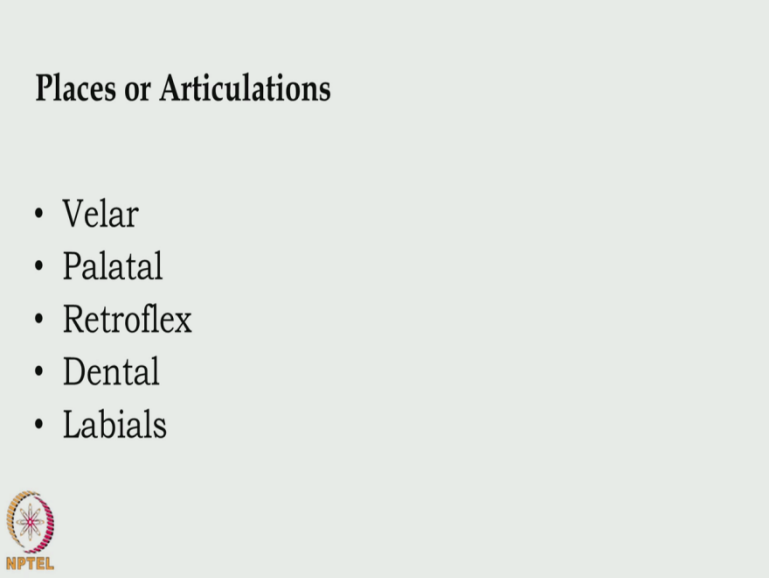

Moving ahead now we want to look at consonant sounds. In the in the set of sounds that we are going to look at and that that very common in most of the languages that we speak, almost all the languages that we speak, these are 5 different places of articulation. So, in the in the oral cavity, we will see the locations of these 5 places, which we have looked at and we are going to see that again.

The sound that come from velum, remember that place velum in that cavity, no we are going to look at that in a moment. Such sounds are called velar sounds, pallet gives us palatal sounds, teeth dental sounds, lips labial sounds and there is something called retroflex, which I will show you in a in a moment. So let us let us look at from more manners of articulation.

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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

Let me first show you actual some of some of these sounds and then this manner of articulation or places of articulation will make more sense, okay. Do these sounds sound familiar? When we say 'ka' okay, let us talk about couple of generic things first to establish certain fundamentals and then we look at their classifications according to places of articulation and manners of articulation.

When we say 'ka', is this which language does this sound belongs to? Is this sound in Telugu? Tamil? Malayalam? Hindi? Sanskrit? English? In a way, all the languages that you may be speaking, okay. And bear with me, I am not just counting these languages for the sake of their names or languages that you may be taking, I am trying to draw attention to the fact that these sounds are not specific to a language, okay.

And similarly, there the manners of articulations that you see on the vertical axis, so if 'ka' is a velar sound, it is not going to change depending upon different languages, this point making sense. The place of articulation is not going to change depending upon different languages. Therefore, we are talking about the process of sound production, which are not specific to a language.

At this point also, if I can remind you about the things that we established way early in the beginning that these are the ways to look at fundamentals of language. Remember, the distinction that we established between language and languages, right. So when we look at these things, or in a particular in these manners, then we are talking about language. We are not looking at languages, all right? Okay.

So it will be helpful if you can if you can say some of these sounds and really see whether these, we to not have to locate velum, but we can see those areas in your oral cavity whether they are really true or not, right. You do not have to say it too loudly, but you can say it, you may you have you have set this sound million times by now, by millions I simply mean uncountable number.

Probably, we do not even remember how many times a day we say these sounds, right. One more time does not make much of a difference and that time is going to be the time when you are really going to see that these are velar sounds, that is coming from velum.

"Professor- Student conversation starts"

So can somebody say this sound loudly? Sudhir can you say this sound loudly?

Ka.

Ka.

Do we see that this is located in this area? Not exactly at this point, but in this area, do you see that? When we say "ka ka", do you see any involvement of lips in that? Teeth? Tongue?

Tongue.

Do you see that?

Yes.

What is the involvement of tongue in production of "ka"?

Back of the tongue.

"Professor – student conversation ends"

So this is the (pa) this is the place, right and this is the tongue back that is back of the tongue, right. Tongue is the long muscular thing in the oral cavity, right. It is not very good looking organ in any sense, but we know how it looks, we see that almost every day. And if we if we into several parts that is tip of the tongue and then you see the sides of the tongue, they are called blades of the tongue.

And then we have back of the tongue, I promise you we will not talk about these things any further, okay it has all such parts have huge role to play in production of a particular sound.

"Professor- Student conversation starts"

So when we say "ka", what happens to the tongue back?

It rises.

It raises a little bit, right?

Yes.

"Professor – student conversation ends"

And then probably it is going to be touching that velum part. In that process, it blocks the flow of the air completely alright. And then when the release takes place, the blocking is not responsible for a sound. The raising of back of the tongue upward towards velum blocks the flow of the air. When it is released, the sound that we get from that part is called "ka" or and we them a name is called "velar sound".

Once again, what is important for us again to keep in mind is this is we are not aware of all these things happening, we are not doing anything on purpose. Remember, just a moment ago I told you, we do not even know how many times we say these sounds. We have, we do not pay attention to this process that we are talking about therefore, we do not know.

Therefore, we we take a moment to think what is going on with the back of the tongue and velum and all that, I I do not know. So in order for us to saying this sound "ka" 100 times a day, 1000 times a day, we really do not have to pay attention to its mechanism, the motor movement available for this sound. However, when we look at it in terms of what is happening, then this is this is where we get it.

“Professor- Student conversation starts”

Palatal sound, so what was the next one, palatal?

Cha.

Cha.

Cha.

“Professor – student conversation ends”

Once again for a generic conformation, is this sound available in all the languages that you speak, “cha”? Now do you when you say this sound “cha”, do you see a difference in the place of articulation between “ka” and “cha”? Yes and it as you can see in the picture, it is moving forward, right. Velum is towards the back of the mouth and palate is almost in the middle, so much so that we can feel that, right.

There are 2 parts of palate, one part is called hard palate, the other part is called soft palate, that distinction is not made in this picture, but there are 2 parts of this, that distinction is also important for several sounds. May not be important for the sounds that we are talking about right now, but there may be some sounds in some language, which may have palatal sounds which are coming from soft palate and or palatal sounds coming from hard palate.

If if there are sounds which are coming from both of them, some sounds from hard palate and some sounds from soft palate, then they are they are given different meanings. For the sound “cha”, we called palatal because that distinction is not important here, okay. And I am talking about only I will I will repeat this thing again, I am talking about only 5 places of articulation because I am I am trying to restrict with this description only to some sounds.

This is not to say that there are only 5 places of articulation in the oral cavity for consonantal sounds, understand. There could be more and not could be, there are more for other languages, okay. It is just that we are not talking about lot of them here, at the end of it, I will give you some of them, some such sounds which will have different places of articulation, which is also familiar with, okay.

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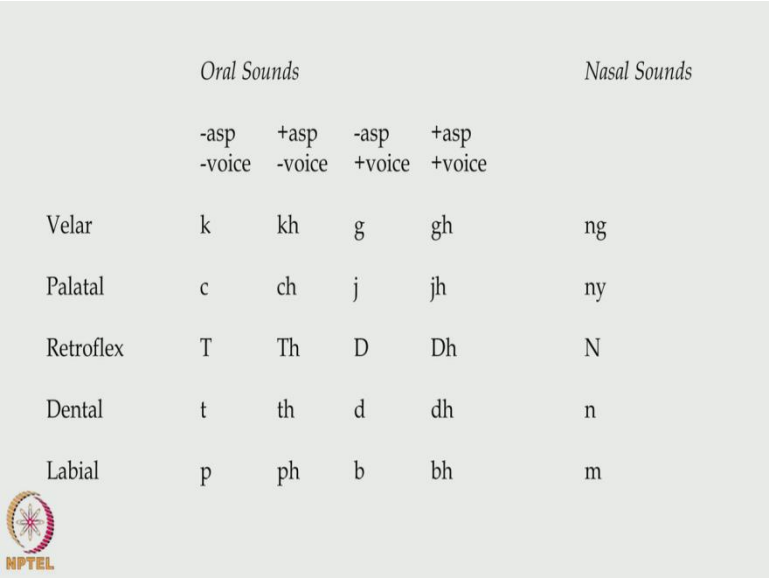

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Just just to see, all right. So in the production of palatal sounds, we have moved forward and now velum is not responsible, what is responsible is palate when we say "cha", right. I am sorry for this arrangement, now the next 2, we leave the next one for a moment, okay. We go to the dental ones, that dental sound is called "ta ta".

"Professor- Student conversation starts"

Do you hear this sound clearly "ta"? Can you say that?

Ta.

Ta.

Can you give me a word where you see these dental sounds, a word with "ta"?

Student:

Tabla.

Professor:

Tabla, very nice.

Student:

Thinking.

Professor:

Thinking is different, we say… thinking is different, let us leave this for a moment “ta”, somebody from there, table is one.

Student:

Tennis.

No, I am coming to tennis in a moment; remember these words thinking and tennis both.

Student:

Thalaiva.

Professor:

Thalaiva, okay.

Student:

Tel.

Professor:

What is the word for “tel” in Telugu or for that matter Telugu, “ta” right? Nobody told me what is the word for tel in Telugu? You have said “tel tel” oil, okay. Do you see the do you hear the sound “ta” in Telugu?

Yes.

That is the sound we are talking about, okay.

Now, what is the place of articulation for this? What is going on with this sound?

Student:

“Ta” the tongue is touching the teeth.

Upper teeth, right?

Yes.

Say it again.

Ta.

Ta.

Ta.

Ta.

Say it again, pay more attention to this and then tell me. What you have said so far is right.

Ta.

Ta.

Tip of the tongue.

That is fine that is fine, tip of the tongue, which part of the tongue? Tip of the tongue, right. Has something to do with it. What does it actually do? Touching that upper part is also kind of true and fine, but it does more than that.

It obstructs the air.

That that is given for all the sounds, see this is why we have already talked about obstruction of air in the beginning and now we are talking about a specific mechanism. It is just that you need to focus little bit more when you are saying "ta".

We are putting kind of pressure.

And when we really is the pressure, it is…

"Professor – student conversation ends"

That that is also true, it is true just like it is true for "ka", just like it is true for "cha". The difference is because the velum is too far back or palate is centrally located, so when the air flow is completely obstructed, we do not feel what you say pressure, okay. And you and

because we are doing the flow of the air to come all the way towards the front of the mouth therefore, you feel the pressure.

That is given, but that is a nice observation. There is something else that is happening which is very clear. Now who wants to say that? Okay, let me say this trivial then see then tell me whether it is true or not. The tip of the tongue goes in the middle of both upper teeth and lower teeth. When you say "Telugu", "Tel" and "Tabla", does it or does it not? You can only feel this when you say this.

Does it or does it not? See it is too obvious also in the sense that it is too much in the front, right. And why you may be thinking that it does not go in the middle of the teeth is also something that I am I am going to show you or I am going to tell you. But 1st say the word "Telugu" the way we say or "Tabla" or "Tel" for many other words with "ta". We are not talking about "ta" like Table.

"Professor- Student conversation starts"

Can you give me couple of more words with "ta"?

Tea.

Tea, table.

Top.

Top.

"Professor – student conversation ends"

We are not saying these sounds; we are talking about dental sounds like "Table, Telugu, and Tel" and more. Do you agree with this thing or you are you are in agreement with this because I am saying so? Do you see, do you feel the tip of the tongue going in the middle of the upper teeth and lower teeth? Now it is too fast, you cannot hold it for long time. It it doesn't stay there for you to feel it.

See, teeth is a very sharp object, right. At the same time, tip of the tongue is the softest thing, if it stays there any longer, you can understand the violence that can that can happen. See this thing therefore, however that happens every time we say that, all right. And it is it is

observable when you say it say these sounds in isolation. If you simply say “ta ta” only when you see it happening.

When you say the words fast, because when you say words fast, you do not see that happening obviously because there may be more than one sound “ta” in a word. When we say (wo) say word which may have 4 or 5 sounds in it, we do not pay attention to the places of articulation of each sound. And a word may have a sound palatal, may have a dental, may have a velar, all kinds of sounds are possible in a word.

Remember these things that we have been discussing so far. When you put all these discussions in perspective, then you see more clearly the generic or fundamental aspect of language that we have discussed so far, all right. Now “ta” says the dental sound for that purpose that we are going to see the tip of the tongue in the middle of 2 teeth therefore, it is called dental.

One more point at this stage, we have talked about 3, velar sounds from velum, palatal sounds from palate and dental sounds from teeth. In all 3 of them, we see the role of tongue, do we do we say that? The back of the tongue is raised up to touch velum, tip of the tongue goes in the middle of the teeth for dental sounds, but these sounds are not named after tongue. That has a role; tongue has a role to play in most of them.

But they are named after different places of articulation in the oral cavity, alright. Okay now the last one is labial. And the pressure that you mentioned, you are going to see that in these sounds more when using “pa”. And we are we are exaggerating some of the things little bit because we do not say the way I am saying it right now when we say the same sound in a word, right.

“Professor- Student conversation starts”

How do we say say “pa”?

Pa.

Pa.

What is going on here? It is a labial sound, what is going on here?

Lips.

What is happening to lips?

(())(32:47)

So the so the flow of the air is stopped and released at lips, right. It is very clear. To be a little bit more precise in the, okay let me say that in the following sense, I have to look at couple of other things for you. In a more precise way, do you see the role of either the lips or just one lip?

Both.

Both.

Both lips.

There is upper lip and lower lips, both are involved in that, right. "Pa" can we say this sound "pa" just with one lip?

No.

No, it is the just not possible, okay.

"Professor – student conversation ends"

Therefore, more precisely these sounds are called by bilabial sounds, I have just put labial here for a particular reason, but these sounds are called bilabial sounds. Just to be really precise. Does this at least make you help the genius of a person who may have done this thing long time ago, right? It even now, it gives us a se sense that we know these things so well.

We know all these sounds so well; we do not even need to pay attention to these things. How many times do we say these things in a day, right? But when these things are brought to our attention, particularly with the idea that somebody paid the attention to these things not when French Revolution was going on or Indian freedom revolution was going on, long-long time ago, right. That that is something really very striking at least, right.

So the and and one more thing, which we should which we should keep in mind and this genius of Panini helps us know at least is human effort to pay attention to intricacies of language even if the level of sounds, words, sentences or mechanism involve in production of sound is not new. It is not done only for computers; it is not done for helping other things.

It was done simply as an intellectual perceive for someone's curiosity to understand what is involved in when we speak, what happens when we speak? This is one question which does not strike us even now too commonly. I am not saying that people do not pay attention to these things, too commonly, right. There are there are lots of other things that are happening to us and we do not pay attention to them too commonly.

So I am I am not saying that sounds are or language is the only thing which everybody should be paying attention to, right. There are many other things that are happening to us or we keep doing to which we do not pay much attention. But language happens to be one of them, I have taking you through various other discussions about various other aspects and this is again one more.

Talking about Panini is not just to talk about a great Sanskrit grammarian who did it long time ago. Important thing is, so long time ago to such minute details that it is not just labial, it is bilabial. And they have given the terms for these sounds, which help us see the precision to which they have worked on without any instrument, without any laboratory.

Or I mean it is easy for us to say from now, probably they did not even know the concept of laboratory at that time. But a lot of time it feels like that will be too much of a claim. Maybe they did, maybe they were talking about other things that we do in laboratory, and we just do not have evidence of such things anymore, right. So that that is that is what these precise descriptions tell us about that time.

Now coming back to see more of what, this system has done and why this system is called generative system and then what it is, how it is applicable, how such things are applicable to production of others other kinds of sounds. But before we go there, let us now look at what we know as manners of articulations. Please look at this chart carefully, I do not have grids here, the sounds that you see this far, these are called oral sounds.

These sounds are nasal sounds, I will I will draw your attention to that also in a couple of minutes, okay. And on the vertical axis we have different places of articulation, alright. And here you see, this is something + - things, these are called manners of articulation, they are simple things I am going to just tell you in a moment um alright.

So first all these sounds here that you see on this horizontal axis, they are all velum, all of them are coming from velum, they are all velar sounds, alright.

“Professor- Student conversation starts”

And what are they when we say what the next one when after “ka” is?

Kha.

Kha.

Kha.

And after that?

Ga.

Ga.

And after that?

Gha.

Gha.

Gha.

Alright, let us stop there.

“Professor – student conversation ends”

Even this much was great, right. We just saw that this was this this gives us a good feeling to understand oh this sound “ka” has a place of articulation which is called velum, right. Even this much is great, looks fine. But look at the further details of it, what is the difference between “ka” and “kha”. This is a very simple question that anyone can ask you.

More air.

More air; see this thing, more air. You may have seen this chart many times. Has has people the study Devnagari chart chart, you may have seen this chart. What I am trying to show you is what you have not seen so far. What is what is shown to us what is done to us in schools, what is done to us in schools with English alphabets, I have already told you, right.

What is done to us with this kind of chart is we are given this thing and we are not given these things. That is okay, we do not have to blame people. Right now, what I am doing is, we are telling you what we are not told ever. We are looking at something that is not visible, that is not clearly told to us. So what is the difference between “ka” and “kha”? Again, more air. Can we say little bit more precisely?

When you say more air, please attention to this, we are not denying that there is no air flow in “ka”, it is only more air and that more is kind of visible, right. And it it is very very simple, if you put your hand close to this, close to your mouth and say the 2 sounds, you will you will you will feel more flow of air in the second one, “ka” “kha” you say that.

“Professor- Student conversation starts”

Can you can you do this that place?

Kha.

Kha.

The more air depends upon how much more you release, but there is more between the 2, okay.

“Professor – student conversation ends”

This is why, and this is referred in modern terms the terminology that I have used is aspiration okay, aspiration. So “ka” is indicated as - aspiration and “kha” is indicated as + aspiration, alright. So that at least gives us one way of distinction between these 2 , if we are looking at only flow of air, right.

Now look at “Ga” “Ga”, so when we see “ka” and “Ga”, both of them have similar flow of air, and still there is a difference between the two. When we say “ka” and “Ga”, there is a difference between the two. Is there a difference or not “ka” and “Ga”? Now if we only put aspiration in picture, then it fails to account for this tension between “ka” and “Ga”.

Flow of air, more flow of air which we know as aspiration accounts for the difference between “ka” and “kha” very nicely. But again, when we want to look at the difference between “ka” and “Ga”, we see no difference in terms of flow of air. Therefore, that

parameter fails, okay. However, what we observe empirically is there is a difference between the two.

So we need to account for whatever is responsible for that difference, we need to articulate that, right. Again, when we say “Gha”, then we see the difference, right. But what we see is the difference between “ka” and “kha” and “Ga” and “Gha”, again we do not see the difference between “ka” and “Ga” in terms of flow of air and we have similar kind of flow of air for “Gha” and “kha”, but still there is a difference between the 2.

Am I am I making sense to everybody? So just flow of air that is aspiration is not telling us much, so there has to be something more. Which is which should be responsible for the difference in these 2 sounds. Now let us go back to vocal cord, what we what we saw in the picture and remember where it is located, it is located in glottis, right. So what after after aspiration that you see in this chart is called voice, right.

Voice is the term for vibration in the vocal cord, okay. If there is no vibration, then that is minus voice and if there is vibration, then that is called plus voice. Now this vibration is is very minimal, it is hard to distinguish, but that is the voicing with that is the that is the vibration, which is responsible for distinction between “ka” and and “Ga”.

However hard that maybe, it is possible where where do you think will be glottis lot is located, somewhere here. So if you put your this thing here and say the 2 sounds “ka” and “Ga”, “ka” and “Ga” “ka” “Ga”, the it is not as nice as it comes out of musical instruments but you do see more vibration when you say “Ga”, okay.

And that is the voicing, which makes the difference between “ka” and “Ga” and also between “kha” and“Gha”. So “ka” becomes a sound which has no vibration, no air. “kha” is a sound which has only more air, but no vibration. “Ga” is a sound which has no air, but vibration. And “Gha” is a sound which has both more air and vibration, get this thing.

Now if we put this binary distinction of more air and voicing in picture, then we can assign distinctive features to each one of these sounds even though the place of articulation is same for all of them. So in that case we can say velar plus voice plus aspiration and then we know which sound we are talking about.

We have to say nothing of what we have discussed so far. Or to put it differently, we only need to say that much and that accounts for everything that we have done so far, okay. So this, the distinction binary distinction which we call manners of articulation, because it is about more air, less air, more vibration, less vibration, these are termed as manners of articulation.

And different locations in the oral cavity are called places of articulation. This may not have been told to us for a reason, but when you look at these sounds then you see why are they arranged the way they are arranged, okay. Now since we are looking at this chart I I should also draw your attention to one more thing. Which one of this these 5 places of articulation that you have seen so far are more audible?

"Professor- Student conversation starts"

Which sounds that we discussed few days ago that children can see more visibly? Which of these places of articulation is easy to see?

Lips.

Lips.

Lips, right.

"Professor – student conversation ends"

They are quite in the front, it is observable, right. Still when we see the chart and this classification, what we see is they are starting at the place which is not visible, right. What would be wrong if they started this whole chart with labial sounds first. In other words, my question is, can you see the underlying precision understating fact that this wants, this chart wants to tell you without writing or without saying that.

"Professor- Student conversation starts"

(())(49:23) where we are stop here.

That is fine, did you absolutely true?

"Professor – student conversation ends"

So in labial, that place is that place is lips and in velar, that place is velum, but why? That is fine true, I am asking is, and please look at this question carefully. What I am asking is, why this arrangement does not start with labial because labial sounds are very easy to see. Remember, even kids start watching movements of lips, therefore they end up saying words like “Papa, mama, baba” right.

They see the movement of lips, they are not really imitating; they are only trying to move their own lips as well and they they end up saying these things, which we think they are saying papa. The child may not know anything about papa what it means or what the word actually means. Now you see why that might be happening, but my question is more fundamental before we stop.

Why not starting with labial first and then velum because labials are more visible and anything that is true about velars, velum is not visible at all. So the person who did this arrangement, what is the rational binding that; is there no rational or is there some rational which is not stated for us to see?

“Professor- Student conversation starts”

Ordering of the sound shows that they startup at the back of the…

They start at the backup.

And then they gradually move out.

Very true.

From throat then palate then finally lips.

Absolutely true.

Then why lips at the end and not (())(51:10)

It has the answer in what you said.

Because we have distinguished between nasal sounds and oral sounds.

Not true but not the answer.

You will learn from sound and not side.

No. That is also true, but not the answer to this question.

The simple answers is, it is not mentioned categorically here, but remember, what is responsible for production of sound, which air; inhaling or exhaling air?

Exhaling air.

Exhaling air.

Exhaling air.

Exhaling air starts modification where?

Glottis.

Glottis and upward.

"Professor – student conversation ends"

Without writing this arrangement tells you that please note, while arranging this this thing in this particular way, I know that inhaling and is not responsible for this thing, so I am giving you the direction in which the flow of air is responsible for production of sounds, you see this thing. If we did, if someone did this today, there is there is no Nobel Prize for linguistic, okay.

If someone did this thing today and talked about all these things, I am not sure about Nobel Prize, but this must have got them some name. But this person did not even write the things they knew about it. Trust me; this arrangement could not have been possible without the person knowing about these things. See the point that I am trying to make, so it is not a coincidence that it starts with velum and goes to labial.

It is moving gradually from velum to palate to dental and others to lips. It could have gone all all the way backward, but not going backward simply tells you that I am talking about the directionality of sounds, directionality of flow of air, which is responsible for production of sound, get this thing? There are there are a few more things salient features of these sounds and little bit more about manners of articulation that we need to discuss, which we discuss tomorrow when we meet at 1. Thank you.