Introduction to Psychology
Prof. Braj Bhushan
Department of Humanities and Social Sciences
Indian Institute of Technology, Kanpur

Lecture – 27
Emotion - Musculature Analysis of Facial Expressions

In the previous lecture we saw that the muscle of the face it plays an important role, and it gives no feedback to us as human beings to derive our subjective experience. In our day to day life we see whole lot of expressions, and this very lecture would be exclusively dedicated to those types of expressions. Some of it which is a specially customized to make you understand things and some of it which has been borrowed from real life sources.

(Refer Slide Time: 00:52)

Look at this very video. See love on her face.

(Refer Slide Time: 01:09)

Valour.

(Refer Slide Time: 01:21)

Grief.

(Refer Slide Time: 01:38)

Homour.

(Refer Slide Time: 01:48)

Wonder.

(Refer Slide Time: 02:01)

Fear.

(Refer Slide Time: 02:18)

Revulsion.

(Refer Slide Time: 02:27)

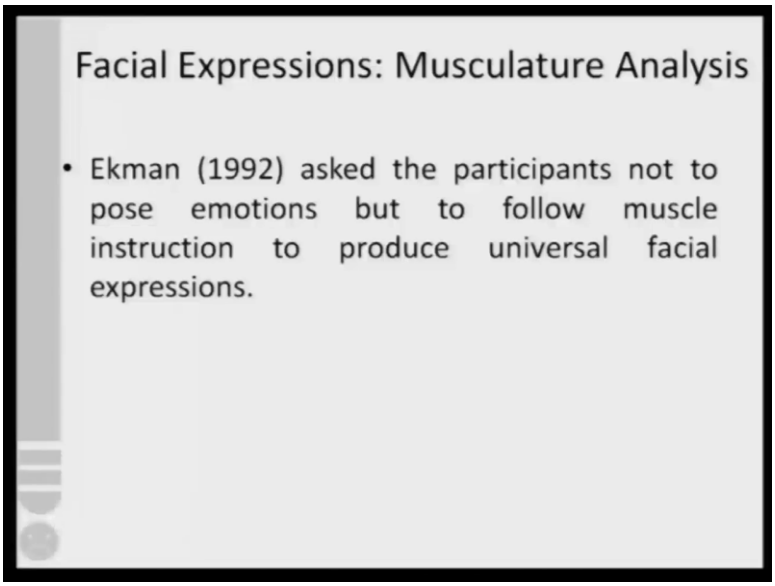
Anger.

(Refer Slide Time: 02:39)

Tranquility.

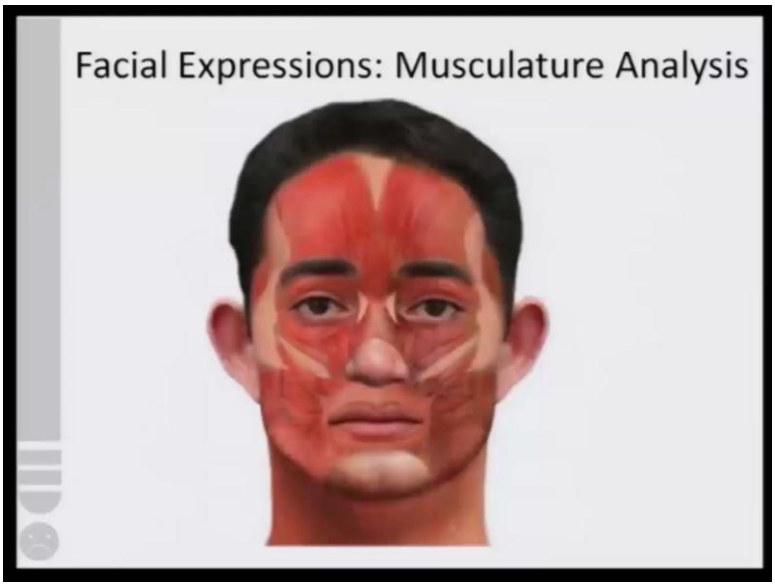
Now, in this very video you realize that there was a trained artist, she was required to show the given emotion on the face and there was a very pronounced change in terms of the muscle of the face. And this tells you that if you start making the musculature analysis of the face you would come across a fantastic area of research altogether.

(Refer Slide Time: 03:20)



Now Paul Ekman he took a set of participates and asked them to pose emotions, but he did not no name the emotion that the individual had to pose rather he asked the participants only to follow the instructions to move the muscles. Now universal facial expressions were derived not by asking the participants to pose an emotion, but by asking them simply to follow the muscle movement instruction.

(Refer Slide Time: 03:49)

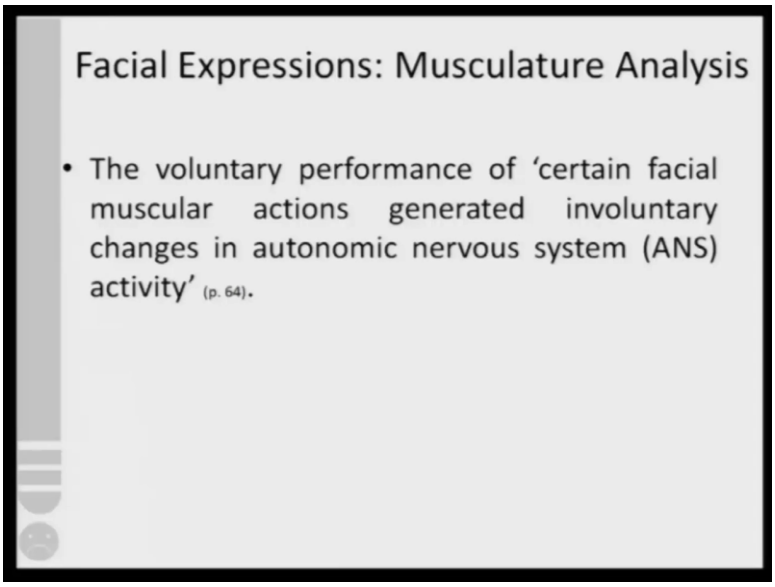


Look at this very image. The image that you see right now it tells you how different muscles are spread throughout our face. And it is basically the movement of these

muscles on the face that is held responsible for adding whatever expression is visible on the surface of the face.

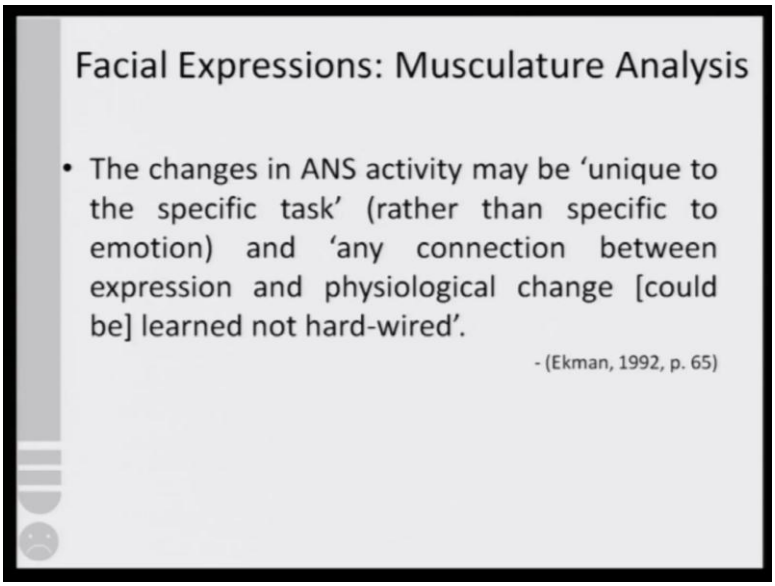
Now, in this very example what Ekman tried doing was that we saw till now is an emotion is there you experience, it you experience, it somebody recognizes it. In this case you wanted the participants just to follow the instruction. If I ask you have to make your lips move apart; that is it there is no other expression. And then he try to make out that how is it that the movement of these muscles they actually are responsible not only for say making the world understand your expression, but he said that the subjective experience that you have that also can be affected by it. And I must say that I thankful to the colleague Professor (Refer Time: 05:12) who agreed for this photo sessions. So, you will see whole lot of photographs where he has posed for certain emotions.

(Refer Slide Time: 05:29)



Now, I am quoting Ekman who said that the voluntary performance of certain facial muscular actions generate involuntary changes in the autonomic nervous system activities.

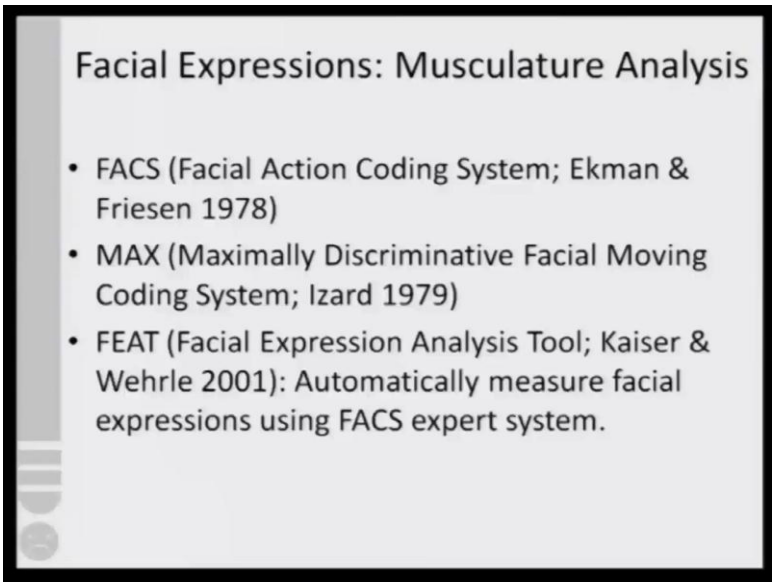
(Refer Slide Time: 05:37)



And the changes in the ANS activity may be unique to the specific task rather than specific to emotion and any connection between expression and physiological change could be learned and it is not hard wired. We saw in the previous lecture that the left side of the face had no little pronounced expression compared to the right side of the face. And based on the musculature analysis also it has been found that the left side of the face is more intense in terms of exhibiting the expression. So, right from musculature analysis as well as the behavioral analysis we will a measure that has been taken. In both the cases it has been uniformly it has been observed that the left side of the face is more pronounced.

Now we will not go in to the details, but just to mention to you that there are coding systems, there are softwares, there are specialized programs which are specifically designed to no understand the musculature analysis.

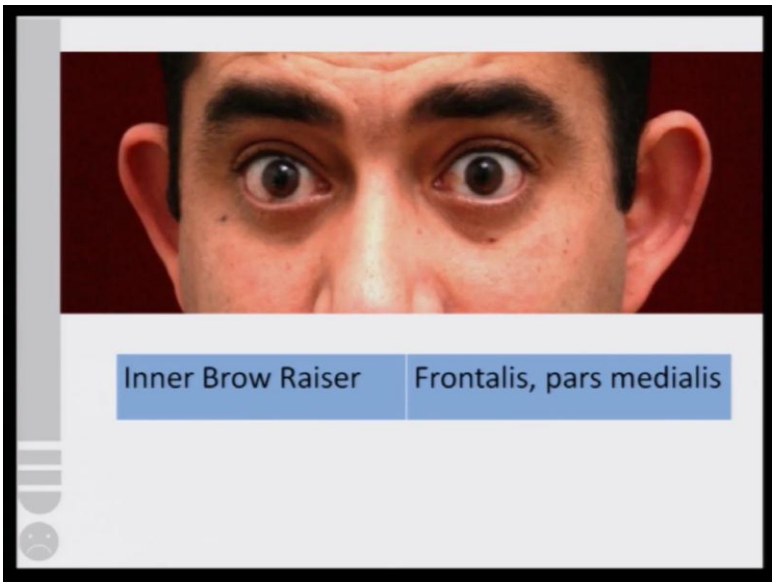
(Refer Slide Time: 06:48)



First one is FACS the facial action coding system which came forward in 1978 and Ekman and Friesen they are the one who gets the credit for it. The second is that MAX the Maximally Discriminative Facial Moving Coding System by Izard and then the FEAT; Facial Expression Analysis tool.

So, now if you look another one or two more systems have coming (Refer Time: 07:17) and people are trying their best right from the computer generated analysis, software assisted analysis to poor behavioral measure to physiological measure changes in the ANS activities to understand emotion.

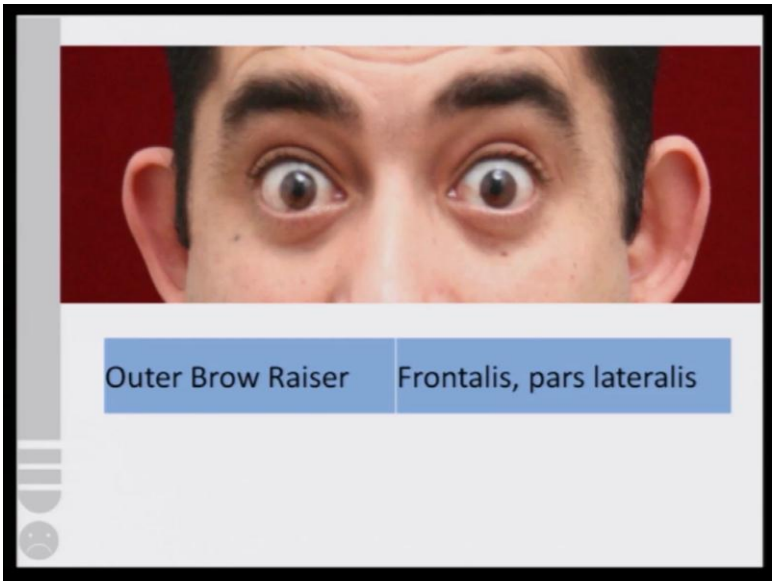
(Refer Slide Time: 07:36)



Now look at this very face, you see the expression understand but we would be looking at full lot of faces and our attempt is to understand the facial expression with respect to musculature analysis.

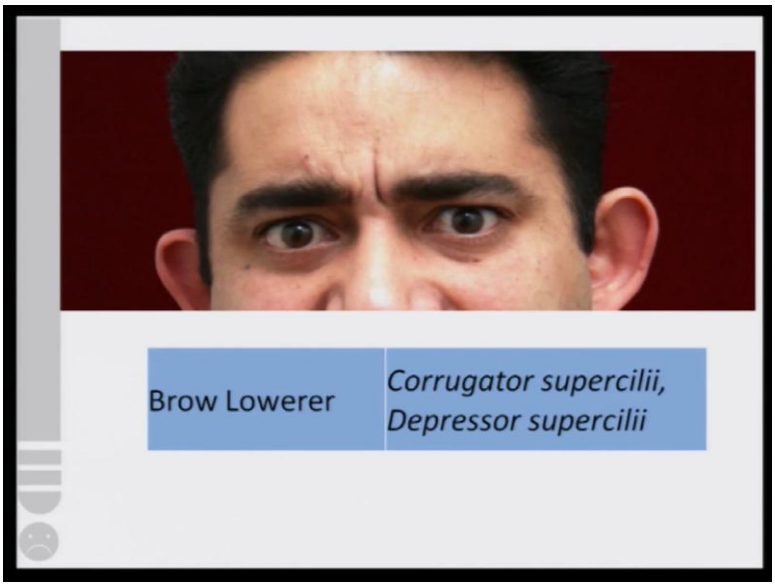
Now, the expression was very distinct, because you looked at the eyes. This was the most dominant feature here in the face. So, what do you saw that the inner eyebrow they were raised and then in the right side you find frontalis and the pars medialis the two muscles which are basically responsible for raising the inner brow.

(Refer Slide Time: 08:27)



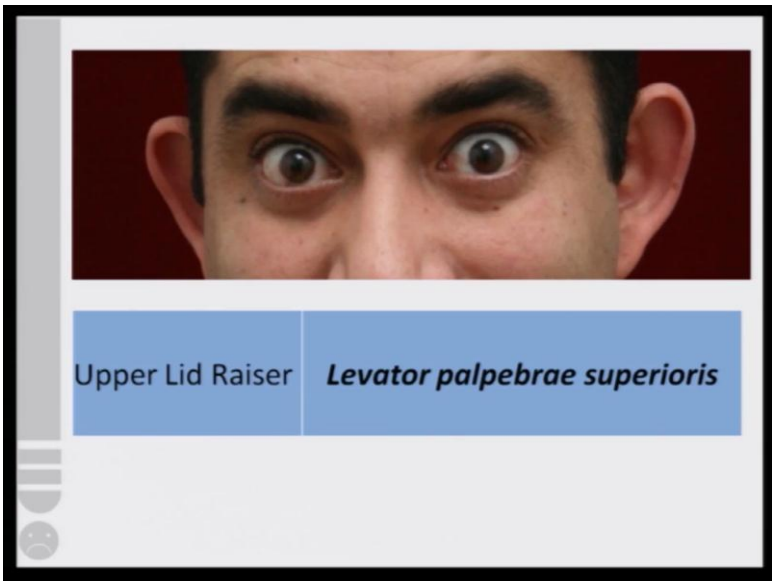
You have the other expression now and then you realize that there is an outer brow movement to. An outer brow raiser again notes frontalis and pars lateralis these two muscles which are responsible for this type of (Refer Time: 08:39).

(Refer Slide Time: 08:45)



You see anger and then you see that the brow has been lay out now. Now supercilii muscle the corrugators and depressor they are one which are responsible for lowering down the eyebrows. And then in the first two cases you saw surprise, now you see anger.

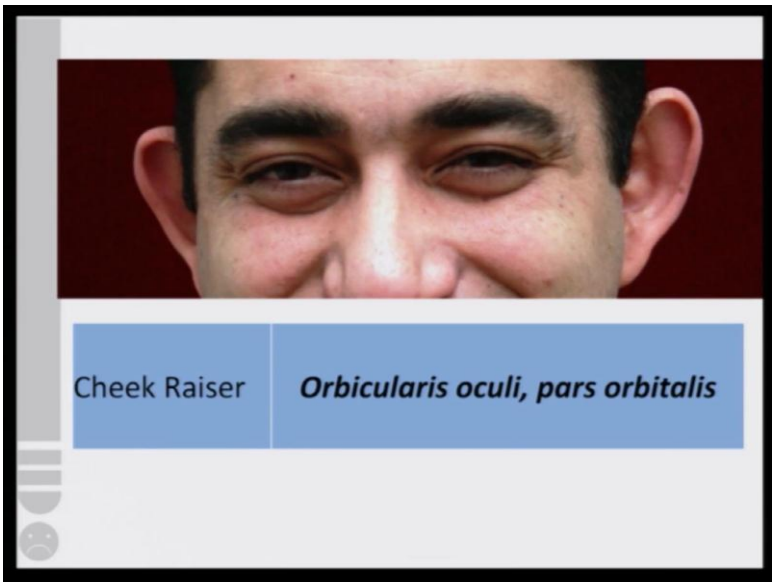
(Refer Slide Time: 09:15)



You see another expression now. Now, it is not only the eyebrow it is also the lips which

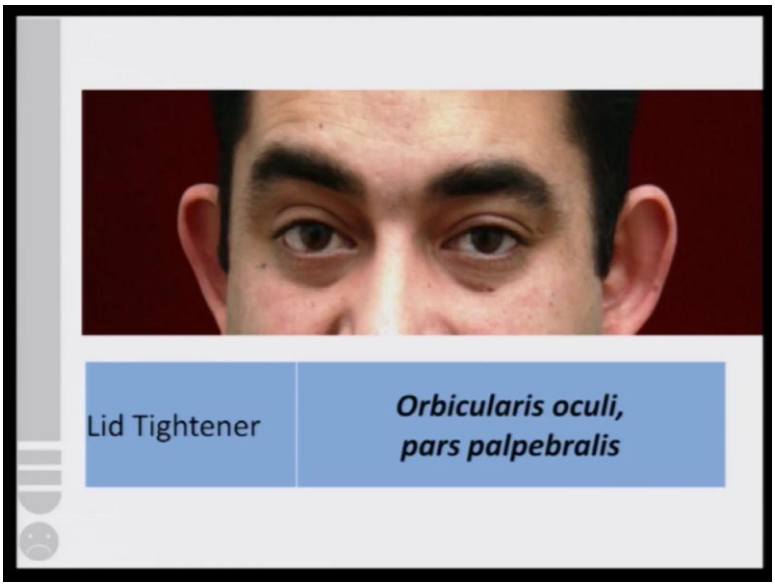
gives you the impression of the emotion. Now you have the upper lid raiser.

(Refer Slide Time: 09:33)



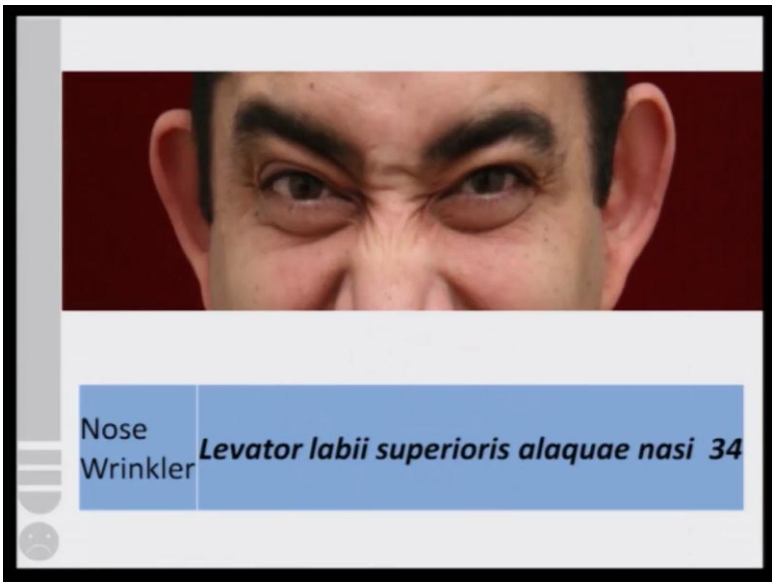
Another emotional expression and then you have the cheek raiser. Now it is orbicularis oculi muscle and the pars orbitalis muscle which are responsible for this movement.

(Refer Slide Time: 09:50)



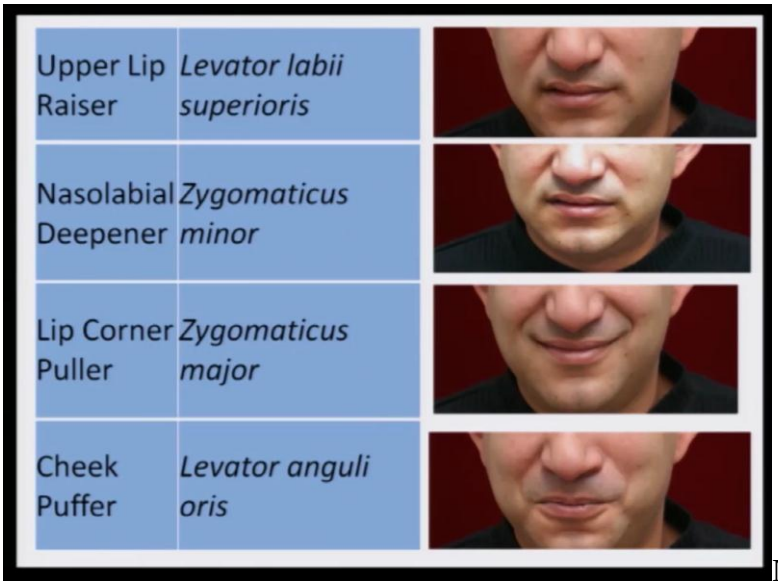
You see disgust on the face and then you have the lid tightener, here disgust of an extreme order and then you say that the wrinkler have actually made the image very very distinct.

(Refer Slide Time: 10:01)



Another emotion, changing in the expression.

(Refer Slide Time: 10:20)

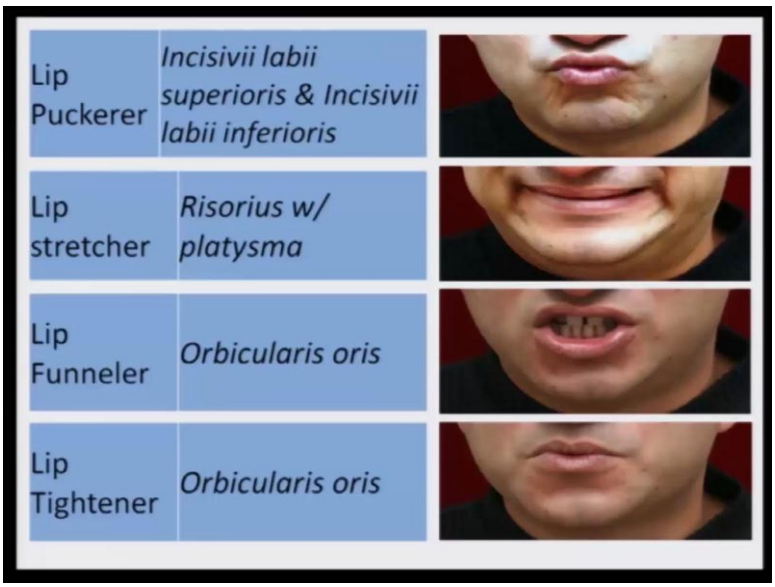


Now you saw the upper lip raiser, you saw the deep lip, again the lip pullar and the cheek puffer. And these were different muscle movements which lead to change on the expression.

(Refer Slide Time: 10:46)

Look at the changes in the lip movement now. And then you realize dimpler, the lip corner depressor, the lower lip depressor and the chain raiser. They different activities are been performed and these expressions are distinctly visible because specific muscle have now moved.

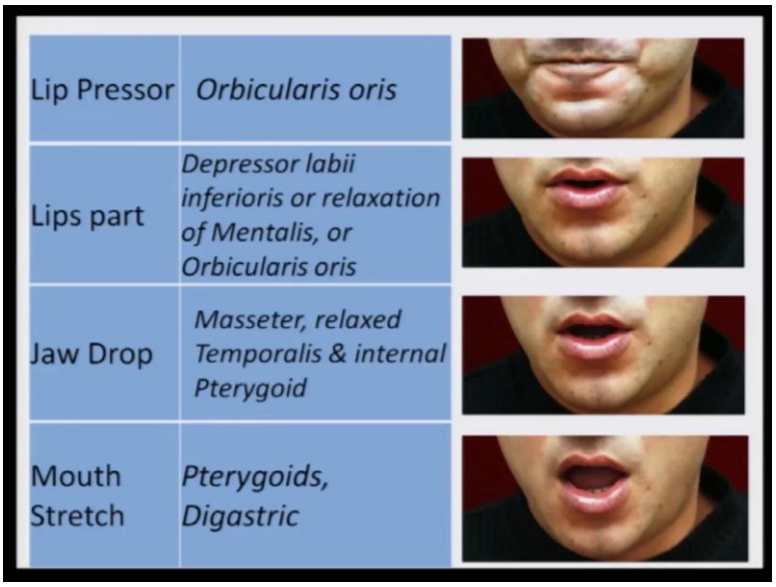
(Refer Slide Time: 11:15)



Look at the changes now this is what we see in our day to day life. Now, you have the lip puckerer, the lip stretcher, the lip funneler and the lip tightener and based on the movement of the muscle the expression on the lips and the area close to the lips that

change.

(Refer Slide Time: 11:46)



Look at the change in the expression now. So, you have the lip pressor, the lips part, the jaw drop and the mouth stretch. Again intensity of this expression varies because certain muscles have no moved in a little different way.

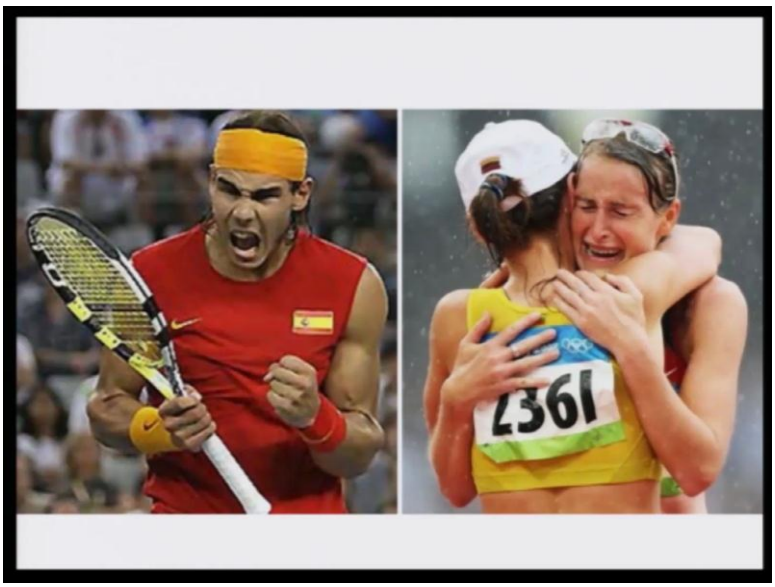
We have exclusively focused ourselves on human expression. You will be surprised to know that whole lot of research is going on in the area of development of humanoid robots and Takanishi lab in Japan they have come forward with humanoid robots which can express like human beings. And this entire development of humanoid robot is based on human facial expression.

Look at this video. What we have seen till now was posed emotions by one of my colleagues and then now robotic expressions from Takanishi lab.

(Refer Slide Time: 14:45)

Look at the images on your screen now. These are real life expressions from two very renowned sport persons of India. When you look at them in action, what you see, what is there on their face? Is it that the athlete is going to make a jump, and this is extremely distressful activity? Is it the anticipatory target that she visualizes she would be able to achieve, that has added to the expression on the face. In the case of the tennis player is it the joy, is it now pride, the sense that you have defeated somebody. These are very interesting things in life to observe.

(Refer Slide Time: 15:38)



Look at these two expressions. First look at the now the tennis player and you will see in the previous case the tennis player had won the match and what was the expression, and in this case you see the tennis player and his expression. Look at the two women athletes there now can you make out whether they have won the game therefore they are emotional they have lost and therefore they are emotional.

From the field of sports you would realize whole lot of expression where establishing the distinction is extremely difficult.

(Refer Slide Time: 16:20)

Look at the Indian wrestler Sushil Kumar know in the Olympics when he was given the medal how mesmerized he was.

(Refer Slide Time: 16:32)

Look at another face; this was one of the most sensitive photographs which were published during the Gujarat Roit. Each muscle on the face is pulled to the maximum expression. Now for understanding purposes it is fine you are looking at the muscle movement, but what appears from the face is something that is more much more remarkable that the world looks at. You must have seen artist when they sketch. One of my colleagues she agreed do for this shoot where no she sketching various human expressions look at them and see that the stroke of the pencil is basically used to demarked change on the expression which actually represents the change in the muscle that try to now we are talking about.

Now, here you have artist who is actually sketching human face and you can see here how the pencil moves. Now each stroke here of the pencil actually defines the fine certain specific expression is being put on the face. You can see here right now it has to do with the eyes the eyebrows and gradually it goes to the lips. Can you sense the expression on the face, the emotion on the face? And now you have special strokes, these are the stroke that actually helps you understand exactly what emotion has been put on the face.

Now understanding of emotion when you look at certain artifacts, of course you have sculpture, you have figurative arts, you have sand sculpture, you have stone sculptures, free hand sketching like this where actually the artist will always try to minimize or

maximize something on the face and that something is actually it has to do with the emotion. Now if you ask these artists that fine, do you know what facial muscles are actually involved in the expression of this type of emotion? I am sure the artist would not be able to do so.

Even though the artist do not know which facial muscle actually has to do with increasing the intensity or decreasing the intensity of a particular expression he or she definitely makes usage of it. And this is interesting dynamics when you try to understand the allied areas of knowledge and how emotion influences these areas.

Besides now representing human sketch and if you look at the dance performance, in the beginning we saw the expression of the dancer look at this live program and see the expression on the face. Now I will show you a very different type of a situation this is not an artistic presentation, this the clip that has been taken out from the news item when people enough given tribe they were suppose to get displaced, dislodged because of the construction of the dam and see the expression on the face.

We started this lecture with the video when the artist was changing expression on the face; we are ending this lecture with again a video and this from a documentary. The reason I am showing this to you because you can see that when you mourned the death of a beloved one in the family the way you cry is also culturally driven. What we have actually done is? We have seen how people express, how muscles are responsible, how the cultural issues the norms they influence and you can see a mix. See this very video and see the impact of culture, death of somebody we mourn a women cries and the pattern of cry is culturally driven.

Actually what you find is movement of grievance when the family members are actually crying they are showing their emotion after the death of a family member. See how culture influences the crying behavior, the display of sadness in these two videos.