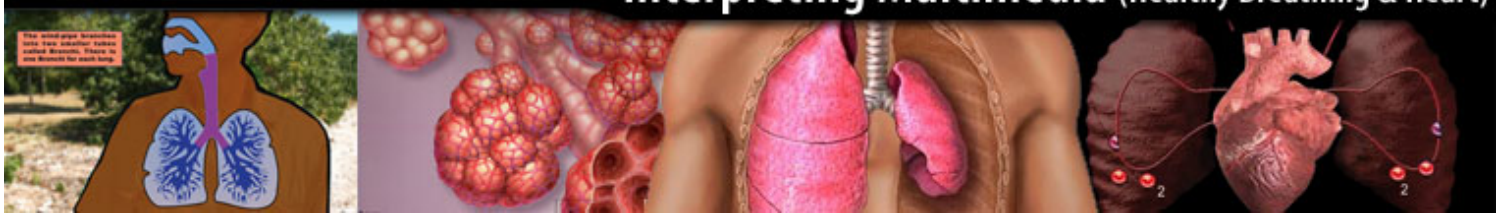


Transcript: Day 1, Session 2

AFTERNOON SESSION

DISC 2

Note: This transcript represents the English language spoken. Spoken Yolngu Matha is indicated by '(YM)…'

RECORDED MINUTES: 1:01.22

REFERENCE: Healthy Breathing Day 1, Disc 2

Note: 'W' indicates the speaker is Waymamba
'W|' indicates the speaker is Wayalwa|a
'D' indicates the speaker is Dhnngal
'M' indicates the speaker is Mundhu
'R' indicates the speaker is Rose
'J' indicates the speaker is James
'F' indicates the speaker is Frank
'WW' indicates the speaker is Galathi
'(' indicates partner of above (?)
'R' indicates the speaker is Rob (from Melbourne)
'M' indicates the speaker is Michael Christie, CDU
'JG' indicates the speaker is John
'B' indicates the speaker is Bryce
'C' indicates the speaker is Christian (does not speak)
This is a reasonably accurate representation of the recordings apart from inaudible and Yolngu Matha words (indicated by '…') and partially inaudible words (enclosed in brackets).

(Audio Time Disc 4: 00.00.00)

STTS Breathing – Front Page

Powerpoint 1 slide 11 (Sharing The True Stories: , 2005 : CRC for Aboriginal Health. Used with permission)

R: Now, this book here is one of the books from the Sharing the True Stories project that Michael and John … associated with and this is the balanda story about breathing. In that project, there were three books.

Dh: Most Yolngu aren't aware of that.

R: No, no.

Dh: Aren't aware of them, no.

R: Of the books?

Dh: No, of the breathing.

R: Just this breathing story, yeah.

M: Have we got multiple copies of that here?

?: (YM) … the communities.

R?: No.

R?: Is this on the website, are these books on the website?

M?: They're advertised but they are not reproduced … no.

R?: So you have to buy them for $30 I think they cost.

M?: Although we've got lots of copies that we give to the people in the renal… Maybe later on we'll have a closer look at those.

R: So this is one way of teaching people about breathing and it's just through pictures, and we'll go through some of the pictures. This is just one way that you could teach somebody about breathing and I'm going to show you some other ways as well, and I want you to think about what's the best way to learn.
0115

Dh: … My brother is a master yidaki teacher and…

R: Yes, if I can, is this Djalu?

Dh: Yo.

R: Yidaki. Djalu, he's your brother, he's a famous man.

D: Yo, and I used to sit with him and teach the class, the breathing. (ie for dideridoo)

R: Yes, and this is a good way isn't it, you need good breathing, strong wind, for the yidaki.

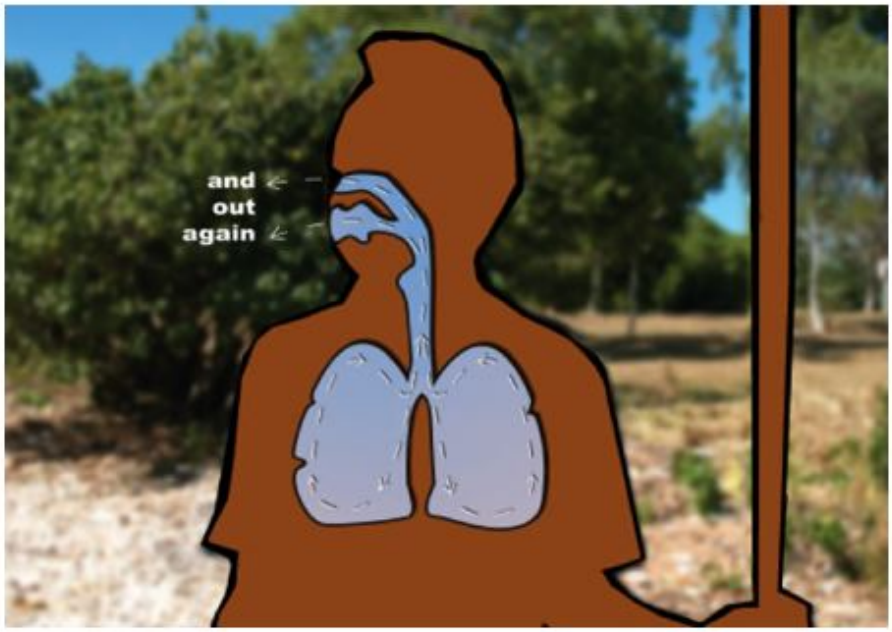
D: Yo, and to not damage the lungs as well. He knows because he's been doing that for all these years and he doesn't have any lung problems.

R: Okay, so in this book we'll go through some of the pictures, but it uses pictures with not much text, just a little bit of writing, but mainly pictures. Its very visual sort of way of teaching. So it says, when we breathe we use ou

STTS Breathing - P 1

Powerpoint 1 slide 12(Sharing The True Stories: , 2005 : CRC for Aboriginal Health. Used with permission)

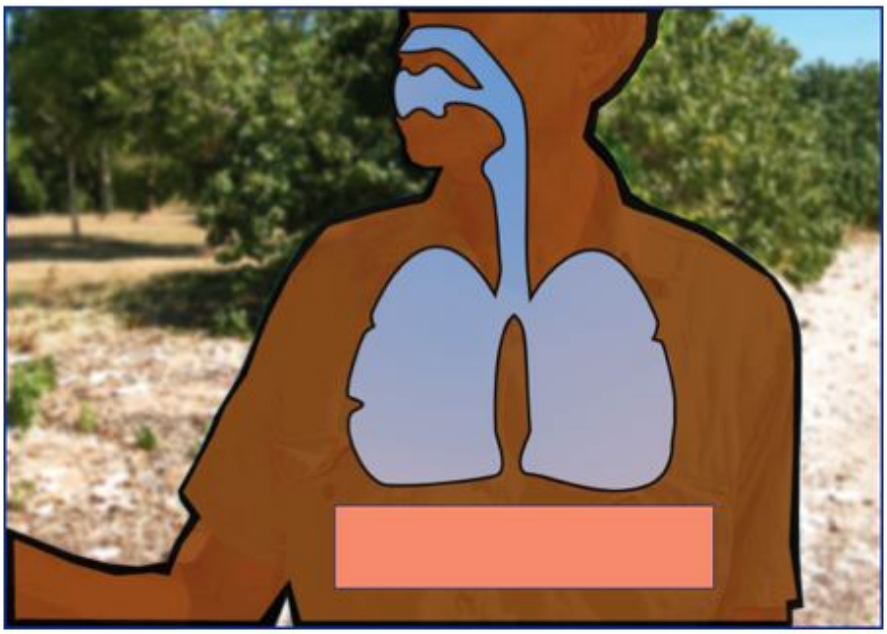
nose, our mouth, windpipe and lungs; and then it goes on to explain some of those things. So here's a drawing of the lungs, the nose, the mouth,



STTS Breathing p. 6

Powerpoint 1 slide 13(Sharing The True Stories: , 2005 : CRC for Aboriginal Health. Used with permission)

the windpipe and the lungs sitting in the chest; so he's telling you where the organs are. Here's the windpipe or the trachea; these are the bronchial tubes, branching out in the lungs; and then it says that this the trachea the bronchia and the smaller branches are bronchioles; and then he talks about the alveolar



STTS Breathing - p 8

Powerpoint 1 slide 14 (Sharing The True Stories: , 2005 : CRC for Aboriginal Health. Used with permission)

which are these black dots which are little bags on the ends of the tubes which are filled with air.
0333
M So do you think most Yolngu people would know about …

D: They know about that … there.

M: So how much do they know and how much do they not know and how much do they need to know?

D: The little bags on the ends of those things… they're the ones that they don't know.

WG: Mak yindi \ir', lingun. Maybe they know the bigger story – it's breathing and that's the end of it. The air goes in that way and it comes out that way. Goes in through the nose and back again that's what Yolngu know

Mundhu: But the small things bits and pieces they don't know.

Mun: I think that (book) is good for explaining.

0418
(Audio time Disc 2: 04.13)

R: It's very important, a very important thing to understand about the alveolar because when we come to talk about emphysema which is a v common respiratory disease, that is mainly affecting the little bags, not the air ways, so it's an important concept to try to get across.

JG: What do the Yolngu think? Where does the air go?

Dh: Into their burrgutj (lungs)

JG: Other Yolngu Do? into the lungs? they all know that?

Dh: Yo, and those little bags, that's what we explained.

JG: Do some Yolngu think that the air goes throughout the body (rumbalkurr)?

Dh: Yes, through the body

MC: air or just blood?

Dh: Air and blood

JG: What to Yolngu think, not you particularly

(YM)…… …

WG: They think it's your blood because it's running through your body.

525

?: Blood is running through your body.

WG: They don't think that it's air running through there.

JG: What do Yolngu think about where the air goes

R: It goes in through the nose

M? There is air here and here and here…

605

WG: When a yolngu is about to die, then the yolngu put the wata from here back again, (by massaging, demonstrates massaging from the shoulders down to the hands) and this way and this way, and bring it back this way..

R: Yes, yes, but.

MC: And they call that wata?

WG: Yes.

MC: So it's the pulse, the circulation?

WG: Circulation, in your word it's circulation but in our word it's wata, wind.

MC: Wind or breath.

WG: Or breath.

R: Yeah, and you think of blood then going out into the arteries?

JG: Or air?

R: Or air? Or air going into the arteries?

?: Yeah.

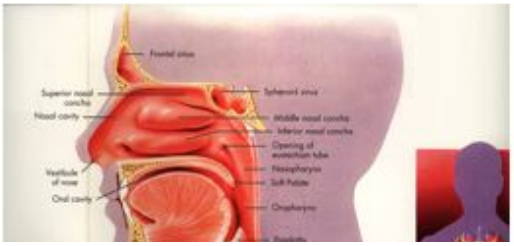
R: You see, this is not so. This is a wrong concept. There is no air in the arteries.

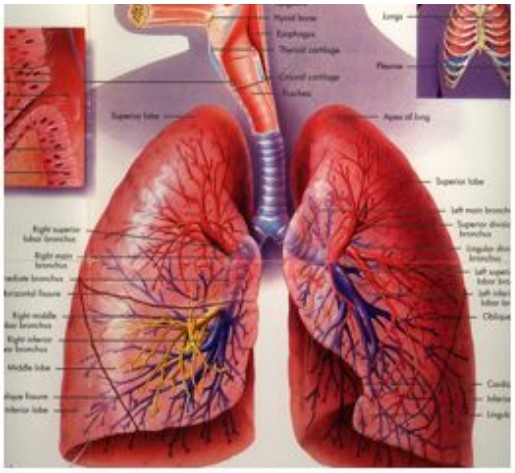
(Frank arrives and John greets him.)

R: Okay, so this is one way of showing breathing, the balanda model, the biomedical model, for breathing in pictures like this. Now this just tells you where things are. It doesn't tell you how it's working it doesn't tell you the function, it just tells you that there is a windpipe, there is the lungs, they have the airways and they have the little bags on the end; but it doesn't tell you what it's for. It's just to describe the structure of the lungs. Now, there's another way.

JG: Do you want to say anything?

R Another way of showing the same things and this what balanda tend to use, this is drawings or charts of the anatomy, of the structures, to show the structures through anatomical drawings, okay? 807





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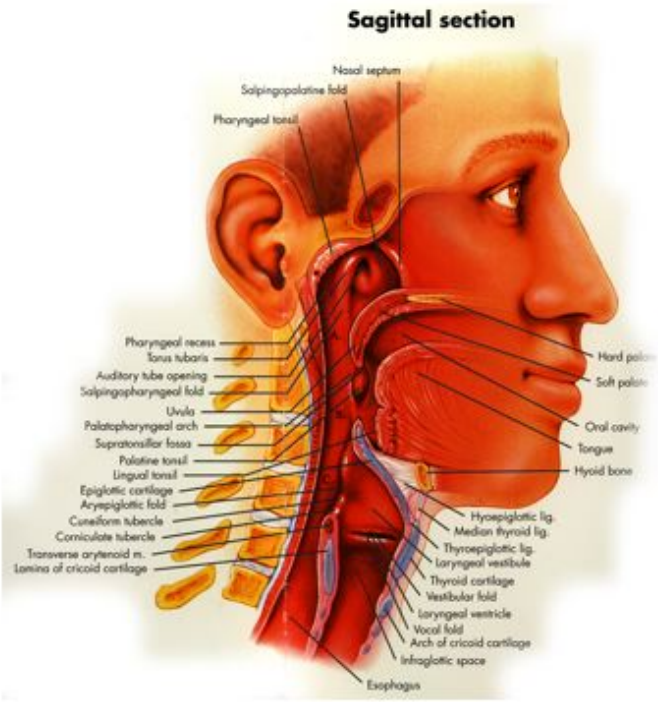
So this one shows the upper airway, here is the nose and the mouth and the throat here; and then the air, and here is the windpipe or the trachea, and the bronchia, bronchial tubes like this, branching, branching, branching and getting smaller and smaller.



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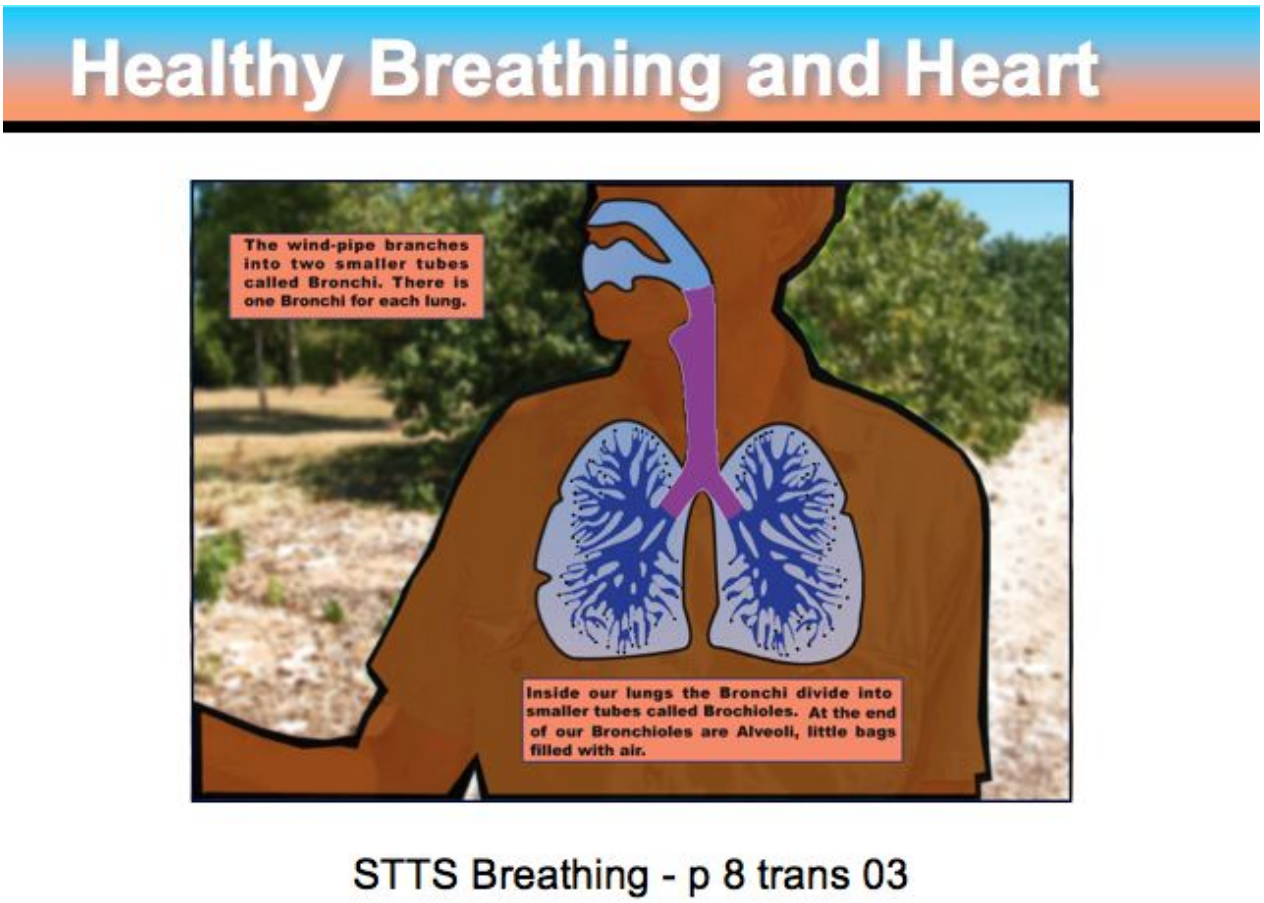
This is just the upper airway; here is the mouth and the nose; and this is he soft palate hanging down here at the back of the throat, this one. And then this is the tongue, this is the throat or the pharynx it's called, and here is the vocal chords for speaking, and here is the trachea going down into the lungs. Now, it's very important; as we'll see later on it's very important to have some knowledge of the different parts of the upper airway if you are going to understand things like snoring or sleep apnea. You need to know the structures up here. So wall charts like this, and there's a big one up there that you can look at afterwards, I use in mainstream to explain; any doctors who have a wall chart like this on their wall and they will talk to people. When I and talking to patients who are heavy snorers or who stop breathing when they are asleep, I might use a chart like this to show them where the blockage, where the snoring noise is coming from. So that's another way of talking about the structure.

(Audio Time Disc 2: 10.14)

R?: Can you just go back to the other one? Do people have any ideas about how useful that sort of thing would be if you're talking to Yolngu about lung problems,



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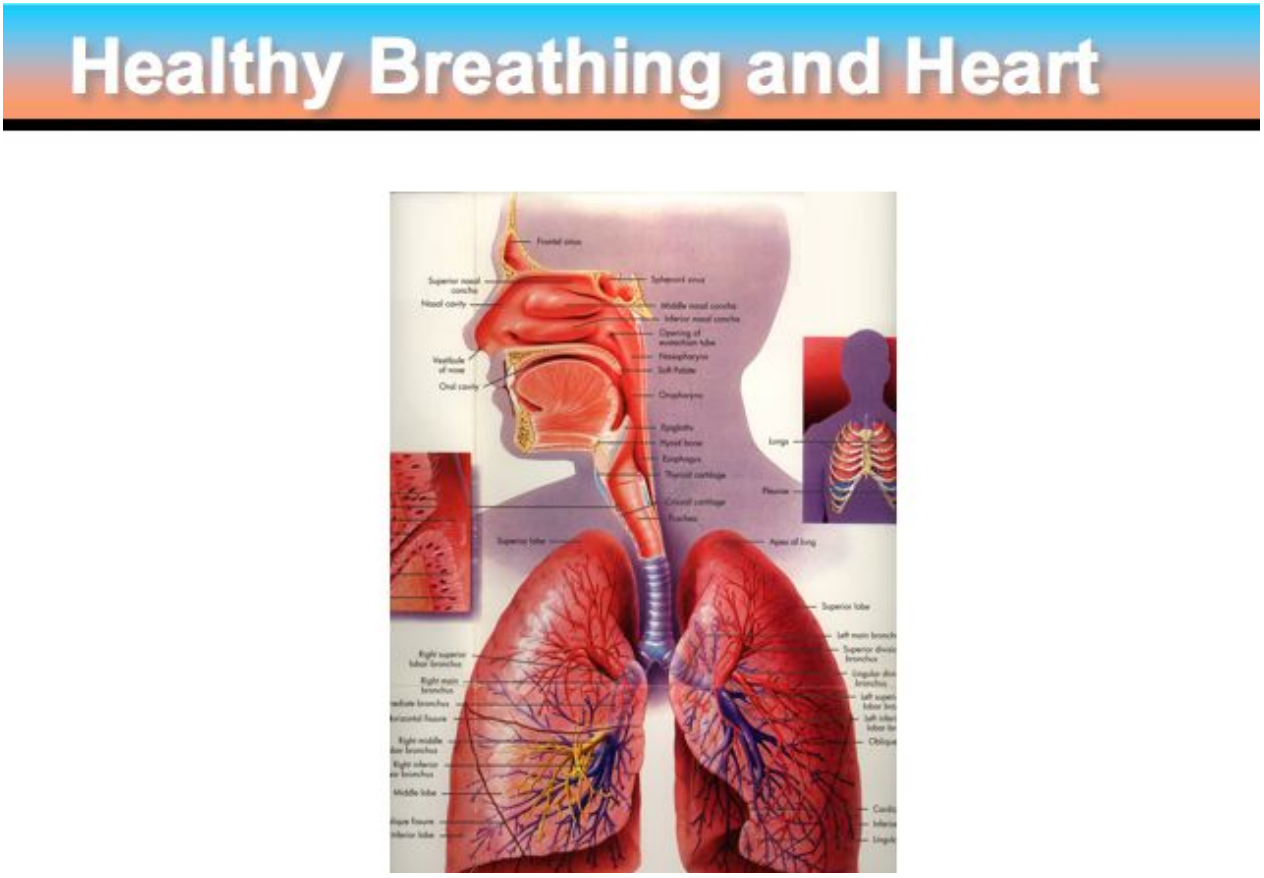
that one, or the next one.



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Does anybody have any comments about whether that makes sense or whether it's useful or?

James: It is interesting when people snore and then later on they stop breathing sometimes. We need to know better how, where the passage.

R?: That's right. You do need to know where is the blockage occurring. Yes. We will see afterwards it occurs here behind the pharynx is where the blockage occurs in sleep apnea.

JG: Is it worth, we talked about what happens to air when it goes into the body before, and maybe the thought that it's also going through the body; is it worth looking at ways in which that could be best described, or will I do that later on?

MC: Are you talking about the gas exchange?

JG: No, not the gas exchange, no.

R: Let me say, the air does not go in your arteries. This is not air. It's blood in your arteries, not air.

JG: Is that so?

R: Absolutely. What I think you possibly mean is oxygen. Oxygen inside the blood goes out through the arteries, but air, the gas, all around us is a gas, air, that doesn't go in your arteries. It's blood, red liquid that's in your arteries. So I would say that air in your blood vessels is not the right concept. This is a wrong concept.

JG: I was just asking you about what resources might…. Yolngu using interpreters…

WG: No… Circulation which comes from there, it's ŋir', breath,

M?: When you hold like that and it goes thump, thump, thump, thump, thump, that's ḏoṯurrk (heart) isn't it. It's not (burrgutj) (lungs) isn't it? …

WG: So you're telling me that the heart speaks from there down to there (the wrist)? …

M?: Yes. …

JG: What is it? What is it?

WG: Well isn't it air?
1258

James: Can you explain to us three key issues here. The oxygen we breathe, the water we drink, and the food we eat. Is that going, is that mixed with something, with blood or oxygen to make it work?

R: Oxygen is a gas molecule and it's in the air, it's part of air, okay.

James: It's got nothing to do with our blood?

R: Yes, because the oxygen molecules dissolve in the blood and they're carried in the liquid blood that goes out through the arteries.

James: The oxygen?

R: Oxygen does.

James: Not the wind? Is there a difference between wind and that oxygen?

1351

R: Air, air contains oxygen molecules and nitrogen molecules, little tiny little molecules. Air consists of about 20%, one fifth of the air is pure oxygen. Four fifths of it are nitrogen and a little bit of carbon dioxide. But oxygen is a gas molecule and it's part of air. This air, all the air in this room, about 20% of it is oxygen and most of the rest is nitrogen. Now, that oxygen is very important because we have to ourselves in our body use the oxygen to make energy, and that's one of the things we'll talk about. But that gas oxygen can dissolve in the blood and I think it's important to understand how the oxygen that's in this room gets into the blood so it can go out through the circulation in the blood, through the pulse, from the heart to the tissues, because that's how our muscles contract, that's how our brain thinks and the kidney works, because of oxygen coming to it through the blood. So in some ways your concept of this breathing and the circulation being together or part of the same thing…

Dhaŋ: … It's just one big whole…

R: … Is true, but it's not all of the air, it's not the gas of the air, you have to work out how the oxygen gets from there, the atmosphere around us, out to our tissues through the blood. So it's a fairly, not a very simple thing to understand.

1606

JG: How do the Yolŋu see it?

Dhaŋ: Yes that's what we're thinking about

JG: How would you tell that story? With pictures?

Dhaŋ: Yes, pictures,

James: If we're going to tell the story to Yolŋu we need the exact story, to talk about everything

Frank: We're not sure about it:

James: 1630 I'm not really sure but I see those three things food, water and air which go into the blood through the food, to go healthy Yolŋu those who don't smoke tobacco. And when Yolŋu run out of breath (ŋoy-gulkthun), 1704 we always say, back off, back off give him some air.

Dhaŋ: the air outside, not inside,

James: Yes

Dhaŋ: unseen, air invisible (buwayak)

James: Where does it go deeper, you know, explain to us because we see when you're talking about it, you know, the oxygen that you're talking about, because all we know is that the wind is blowing, then we breathe, in and out.

R: Yes, exactly.

James: And we don't go into….

Dhaŋ: We are trying to find a way.

R: So you need to understand the function, how the lungs work, how the system works.

Dhaŋ: We understand what you're talking about, it's finding out a way how to explain it to the …

M: To the patients.

R: Yep, okay. Well, I can show you how I would explain it.

James: More than that (are you listening?)

JG: Michael, your turn …

R: Okay.

Dhaŋ: We need to be able to come up with some things to be able to explain it to them.
1838

M: Just in terms of what you were saying before, what I've said before is like four shows. The first one is just burrgutj (lungs) … The second one is called gas exchange, that's the whole thing about the oxygen and where it goes into those little red things and little blue things inside the very tiny little things there; so the gas part is part two of this story. This is part one which is just, I don't know what…

(Laughing)

R: It's the mechanics.

M: It's lungs.

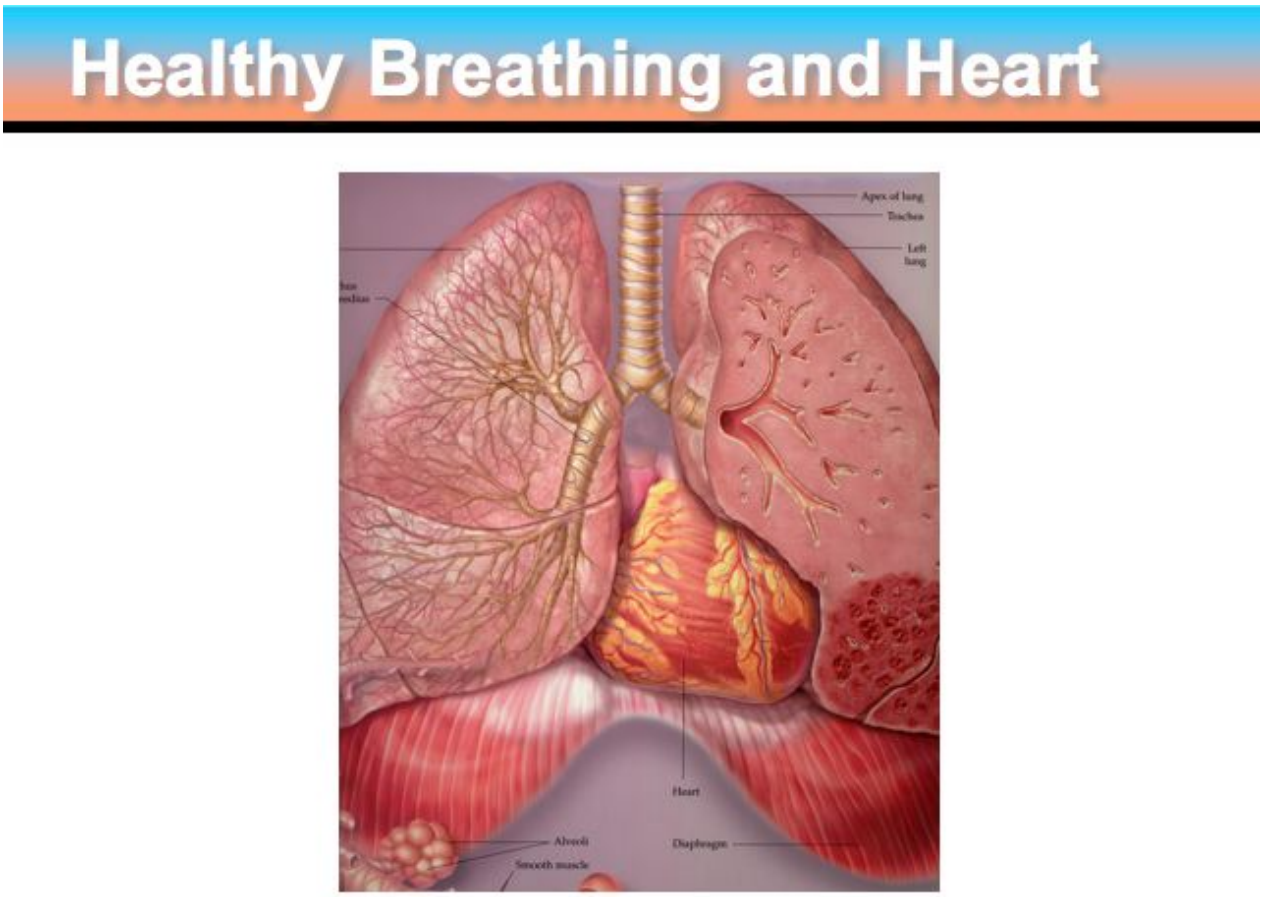
R: Lungs, how do we …
1907

M: You can follow it through in here and see where it's going.

R: How does the oxygen get from the room into the airbags? Right way out here in the very far out.

M: We're on page five at the moment.

R: So these are just pictures of the lungs.



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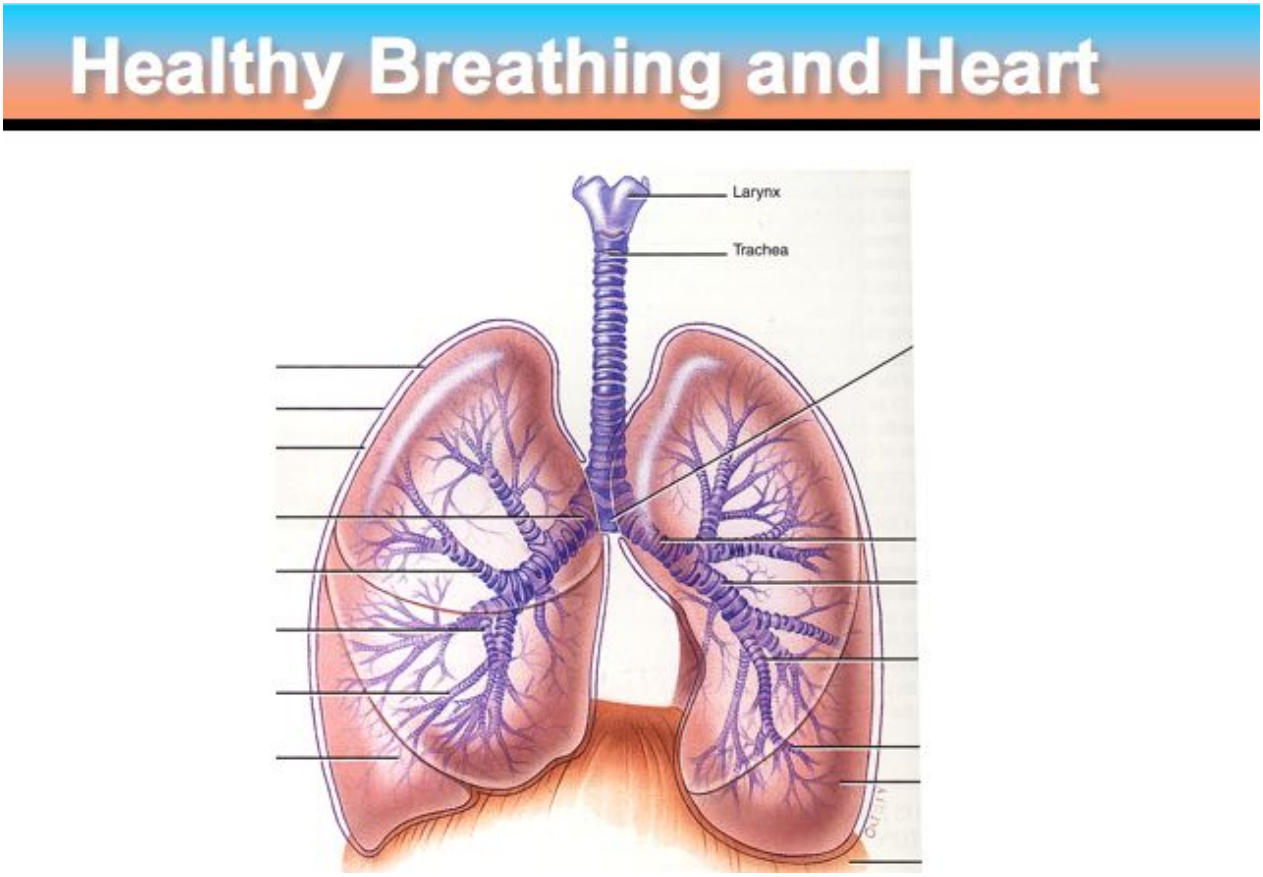
Okay, there's the lungs, here's the trachea, this is the heart and this is a big muscle, the diaphragm, so this is a very important muscle for breathing, the diaphragm. Now, this is a close up picture of the airbags;



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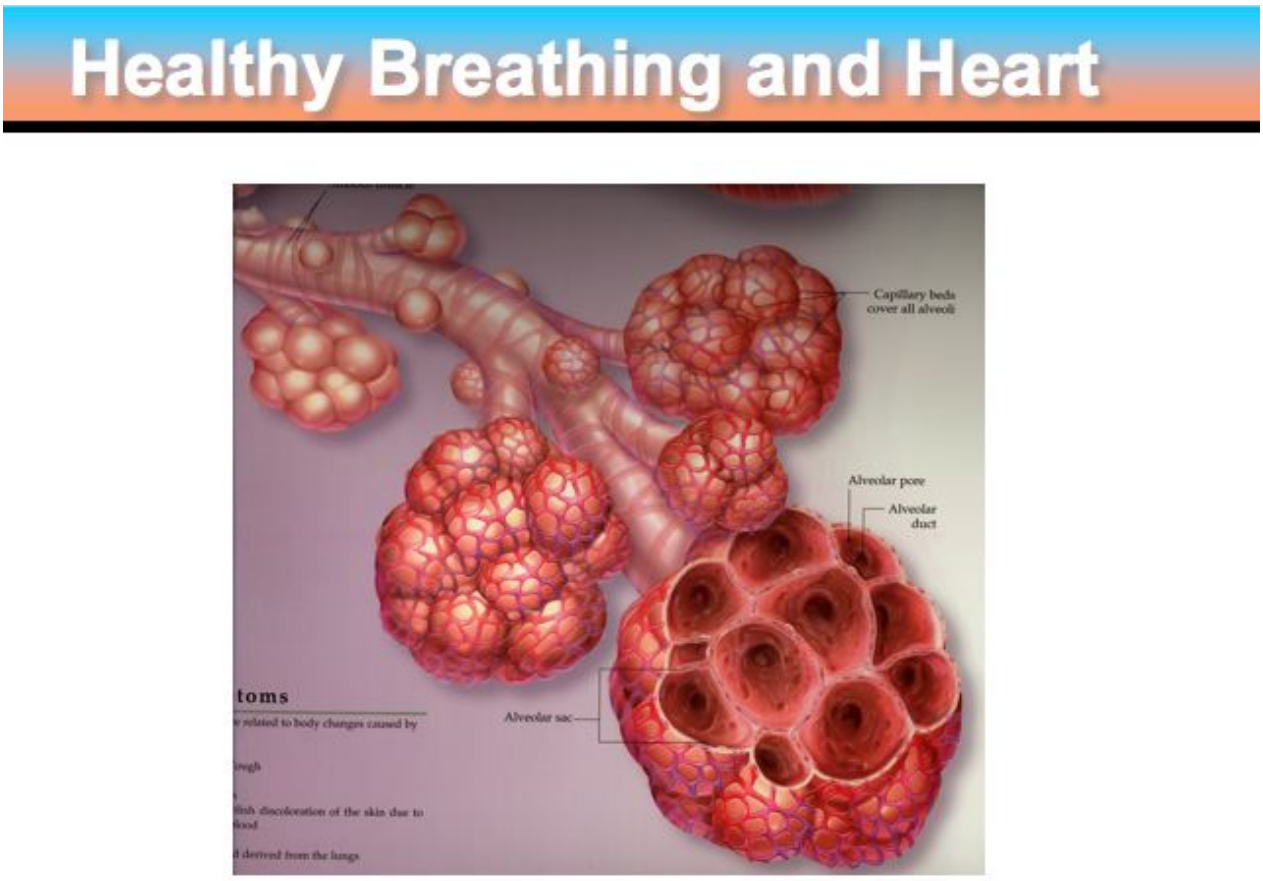
so the bronchial tubes, branching, branching, branching, and then they come out to just a little group of airbags or sacs, okay. So the air comes in through the bronchia and gets in these



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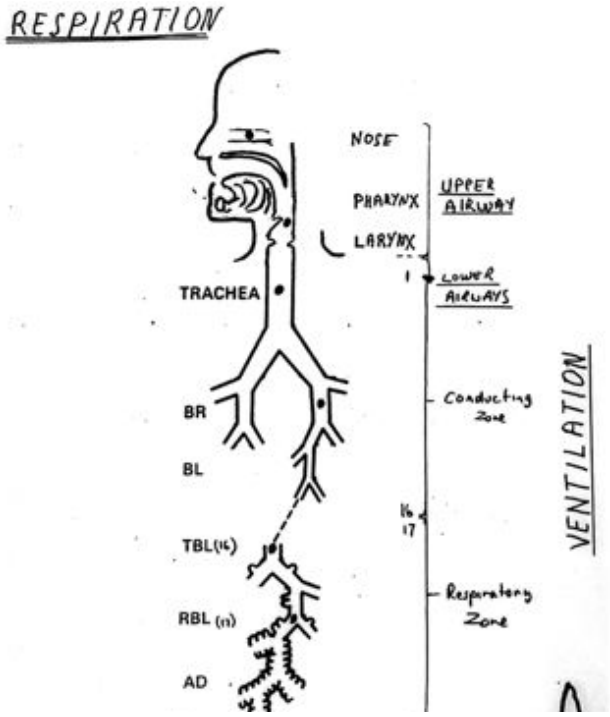
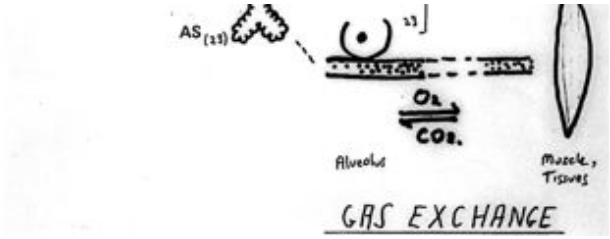
air sacs and around the outside of the air sacs is tiny little blood vessels called capillaries, and this is where the oxygen from the air gets across into the blood. Now, I'm going to explain how that happens. But first of all the oxygen has to get from the air all





Powerpoint 1 slide 23 (Attributable to Rob Pierce)

the way out here so it can get near the blood, so it can go into the blood. So this is another way of showing the structure of the lungs.

Powerpoint 1 slide 24 (Unable to obtain permission to show illustration)

This is where plastic was poured in to an air ways and then the lungs are taken away, so this is a model of just the branching airways where the air goes. Here's the trachea, the main bronchia, the bronchioles, branching, branching, smaller and smaller, and smaller, out to the air sacs.

MC: Did they do that (make the image) with a dead person?

2135

R: Yes. Somebody took a dead person's lungs and tipped plastic or something that was liquid but then set hard down the trachea and it fills up the hole of the bronchial tree.

M: If you've got any comments or questions say them while we're going along.

WG: What sort of plastic (would they use to do that?)

R: So this is a way.

?: (YM) … What kind of liquid plastic?

M: Like araldite or something. But he was already dead.

(Laughing). 2210

R: In drowning, the water fills all the lungs, all the airways like this, okay. Now,

Powerpoint 1 slide 25 (Unable to obtain permission to show illustration)

this is a cut section through the lung, okay. I would say this is an anatomical specimen. If you take out a lung and you cut through the lung.

WG: In the middle.

R: In the middle.

Powerpoint 1 slide 26 (Unable to obtain permission to show illustration)

So see here, this is an airway, you chop across the airway running out this way and this is like a sponge, all the little air bags or the alveoli are like a sponge,

Powerpoint 1 slide 27 (Unable to obtain permission to show illustration)

so now we go closer, a bigger picture. Okay. These are all the little air bags or alveoli and here is an airway running through, like a sponge with the airways inside. Now, this one. 2313

Dhaŋ: Is turtles different to humans?

R: A turtle?

WG: A turtle's lungs.

R: Ah… Similar. Similar. I think. I'm not sure about a turtle but a wallaby would have lungs like this or most animals. I've never seen a turtle's lungs so I'm not sure.

dhaŋ: Wallabies are similar.

R: Similar to this. Yep, it's a yellowish sort of colour. Now this one, closer, closer, closer. This is a very small airway, way out in the edge of the lung and these are the air bags. Okay. Now, notice how the walls between the air bags hold the airway open, they're supporting the airway and holding it open so that air can flow through here

and then it gets out into the alveoli. These are the air bags. So this is, if you cut a lung and you look under a microscope, this

Powerpoint 1 slide 28 (Unable to obtain permission to show illustration)

is a microscope picture of a human, a real lung from a human being, okay. Or an animal would look very similar.

MC: Do you think pictures like that are useful interpreting?

Dhaŋ: Yeah, yeah.

R: Is this better than a diagram? Is this one better than this one? Which do you think? This one is the best or?

James: I like the coloured one better.

R: The coloured one's better?

M: The other one's just a model that's been drawn whereas that one's a true (yuwalk) photograph too.

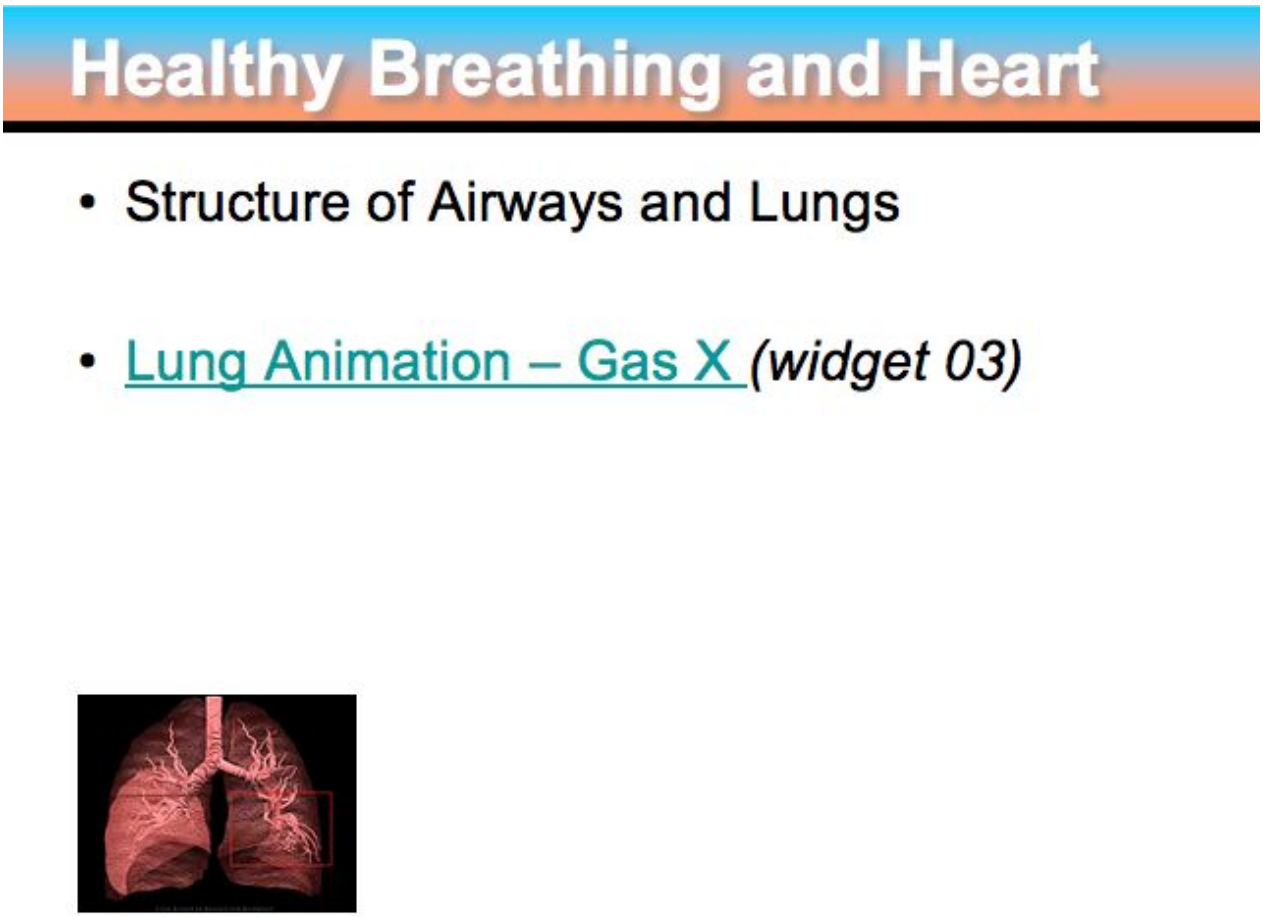
R: This one is real. A real life. The other one is a picture.

JG: How about the (other image), what about that?

R: It's coming. All right.

Dhaŋ: This one's better.

R: Yep. Now I will show you some other ways to show the same thing. 2518



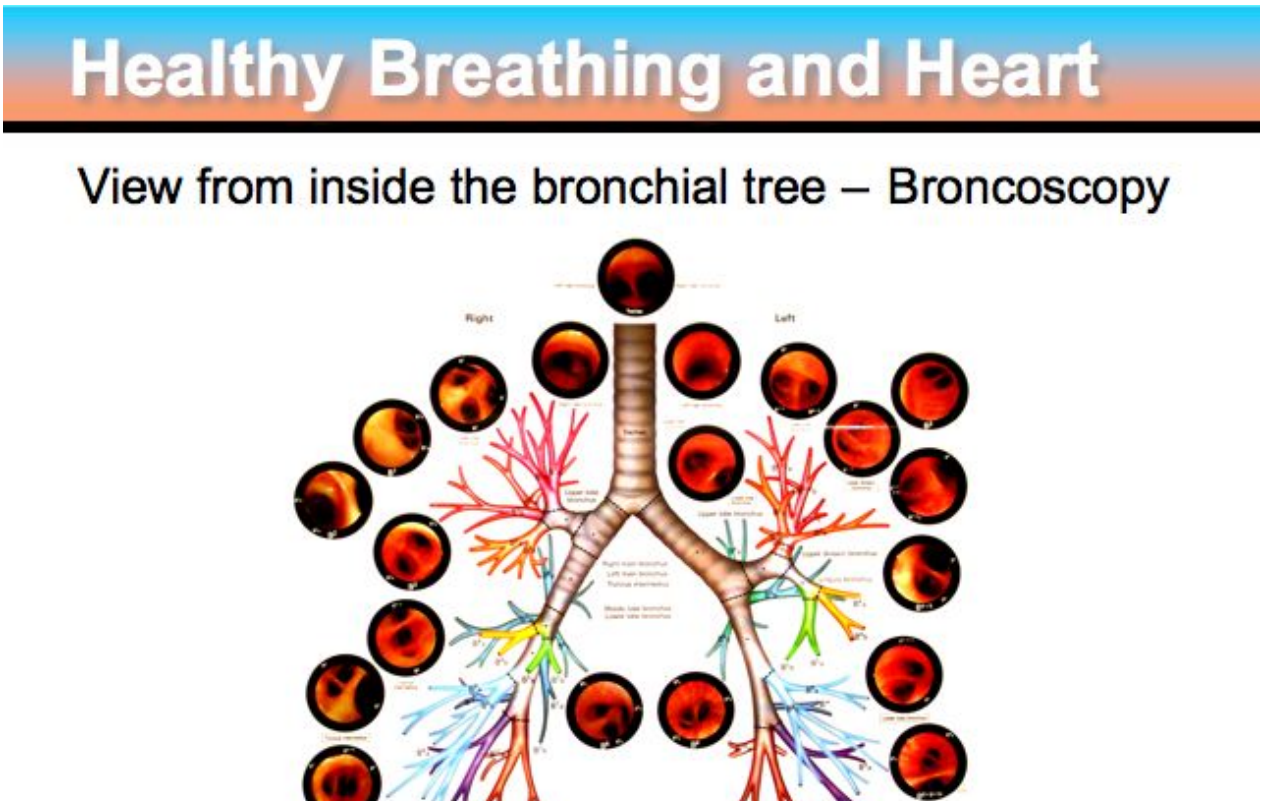
Powerpoint 1 slide 29

(The Gas Exchange Project. 2006. Lung Animation - Gas X (widget 3) "A/Prof Louis Irving, Respiratory Medicine A/Prof Gary Anderson, Pharmacology Department" "Royal Melbourne Hospital, University of Melbourne". Permission pending)

This one is an animation. So here's the trachea and the branching air ways, and now it's going here, fine, branching, and now it's going here. This is the air bags. This is the blood vessels and the capillaries around them. Then this one here is the oxygen coming in the air ways and then going across into the blood. So we'll learn more about this one later, I'll come back to this one. This is another way of showing, this is an animation picture for showing the air ways and the air bags.

M: And the one up there in the little box, that's the gas exchange that he's going to talk about in part two. That's where the ŋir' (breath) dissolves in the water I think.
2627
R: Okay.

Dhaŋ and WG: agree the animations are good for talking to old people



Powerpoint 1 slide 30 (CR Kennedy Pty Ltd. Permission pending)

R: Another way is to have a bronchoscope which is a tube you can put down here and you can see the inside of the airways. And this is a test that we do in the hospital when we want to see if there's a cancer in the lung or something blocking the airways. We can have a look down. And you can take pictures through the bronchoscope and this is what it looks like inside all the branching tubes.
2706
M: Those are little photographs.

R: Photographs through the scope. Okay.

Powerpoint 1 slide 31 (Attributable to Rob Pierce)

R: And this one is the larynx, if you're looking down and you're looking at the vocal chords, when you speak, aaa, the vocal chords come together, and you can see the vocal chords. This is the vocal chords again.

Frank: Rob, excuse me, I'm feeling a little bit sleepy. Just to brighten up everybody. I'll just make a joke – what is that, is that really a tree in there? 2755

MC: It's interesting because they do call it a tree.

Frank: That's just my little thing. Sorry. I was trying to wake people up. I was just saying that, later on I'll tell you my ideas. Now I can just see a tree.

R: Okay. So this is what you see when you're looking down a tube from the inside. 2833

M: There's a little tube with a camera on it, a tiny little camera.

R: So these are from the inside, you can see the branches going off as you go down, so this is from a bronchoscopy test.

M: Can you see that?

Frank: Yeah.

R: This is what it looks like. Very pink. And you can see the little branches going further and further out. You start here and you put the tube through the nose, down through the voice box, down through the trachea and then way out into these smaller air ways.

Healthy Breathing and Heart

View through bronchoscope as it is passed through larynx and out into bronchial tree.

- Bronchoscope (movie - widget 14)

Powerpoint 1 slide 33

So this is another way of showing what the inside of the lungs look like and this is the moving picture way of showing it. 2931

Healthy Breathing and Heart

Air/Oxygen is drawn in through nose and mouth, down through larynx, windpipe and airways into the alveoli

- Bronchial Side View *(movie – widget 09a)*

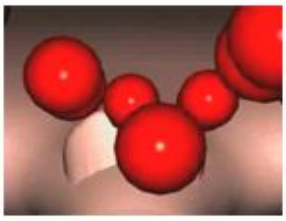
Powerpoint 1 slide 34

Now, another way is, this is an animation so this is a multi-media person has made, drawn a whole lot of animated pictures, and this one is to show the

Healthy Breathing and Heart

Oxygen gas molecules (red) being drawn down from the larynx, through the airways to the alveoli.

- Bronchial *(movie – widget 08a)*



oxygen molecules in the air; so these red things are the oxygen molecules and you'll see them going in through the throat, I hope. So here. So these are the oxygen molecules.

WG: They are traveling through that throat and into the lungs.

R: Yep.

(Audio Time Disc 2: 30:23).

R: Okay now, see this. Here it's going through the vocal chords, down here, and here is in the wind pipe, just in the trachea. Then here, further out now, going out through all the little branches, okay. So this shows how the oxygen gets out into the lungs, right out into the air bags here at the end. So this is an animation way of showing the story, it's called animation.
3103
M: And those little red things that the oxygen has part of in the air so that they look like little objects and it's actually wata (air)

R: So do you think that that's a useful way of learning how the oxygen gets out into the air bags?

Dhaŋ: Wata dhaŋu rumbalŋa, (the air is in the body) that's how Yolŋu describe. What they really mean is the oxygen…

R: Yes. It's part of the gas, okay, it's the gas. Do you think this way is better than the bronchoscope way?

WG: (YM) …

R: Where you actually see the inside picture? Is that a better way or is this diagrammatic animation way better?

M: Yeah, all right, so thinking about it, and they'll talk about that … So it's about the animation or whether the photograph.

Dhaŋ: We'll talk about both ways though.

M: Yeah, although …

3232
R: Now, I want to talk about the idea or the concept of why does the air go in? Why does the oxygen go in? What makes it go in? We know about the structures now, the windpipes and the airways and the air bags and the diagram and the lungs, but what makes, how does it work? So what I'm going to do now is try and give you a couple of different ways of explaining how the system works. Now, one way of thinking about this is that air or fluids flow

CONCEPT OF PRESSURE – Respiratory PUMP

Air/fluids flow from any place of high pressure (+) to a place of low pressure (-)

+ ve pressure in chest : blowing yidaki/digeridoo

- ve pressure in chest : sucking through a straw

If straw walls are strong : fluid flows in

If straw walls are floppy : it collapses + blocks flow

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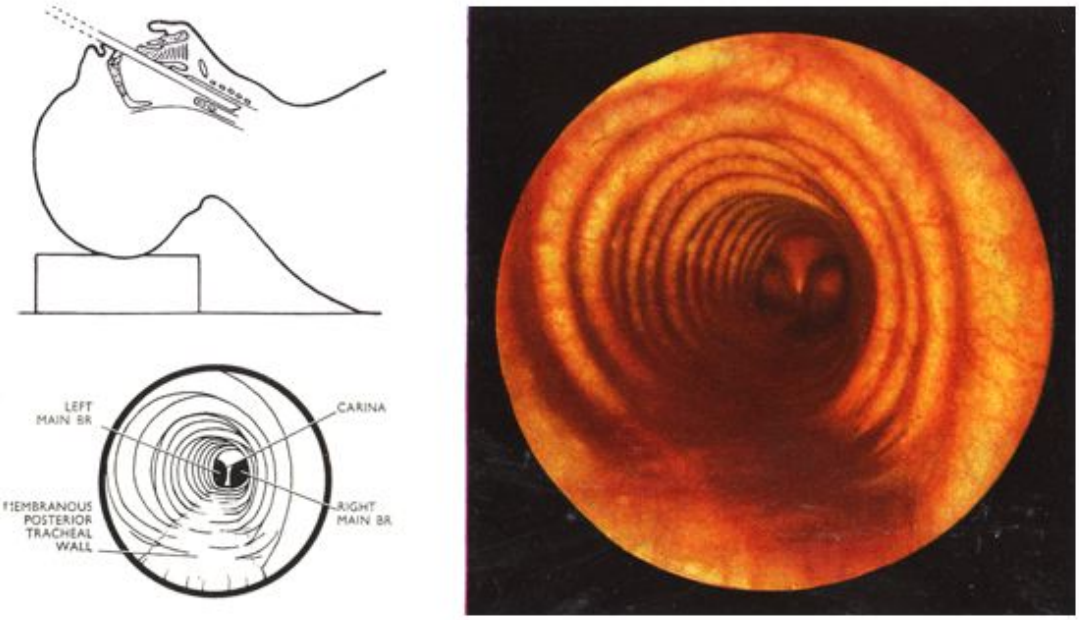
from high pressure to low pressure places. Now, you can make a positive pressure in the chest, you can make a positive pressure and the air comes out. That's what you do when you're playing the yidaki for example. Or you can make a negative pressure, to suck the air in, so we have the atmosphere here, if we make a negative pressure inside then the air with flow in. So that's very important for breathing. We breathe in by making a negative pressure inside the chest so that the air is sucked in, okay. So that's the idea. The negative pressure inside. Now, if you suck in, you have to have a strong tube or else the air won't flow in because the negative pressure will try and make the tube or the trachea collapse; so it has to be a strong tube and this is the inside of the

Healthy Breathing and Heart

- …..Add text here - Plate 5



Powerpoint 1 slide 37 (From Diagnostic Bronchoscopy: 1973 Page 26 Plate 5, P Stradling, Churchill Livingstone)

trachea like you saw before, and these rings are cartilage, they're hard, so that they make the inside stay open even when the pressure inside is negative. So you can suck air in and the trachea won't collapse under the negative pressure.
3500
Dhaŋ: Like a washing machine drainage system.

R: The washing machine drainage system is positive pressure pushing the water out of the machine. It's a pump that makes a positive pressure to push the water away. I'm talking about a negative pressure inside so that the air will be sucked in.

WG: What do you mean by, depending which way more than what is negative … that's inside the body and outside …

R: Okay, I'm going to do that now. This is another animation that I had made down in Melbourne just before I came up. Now. One way to think of… Why isn't that projecting up there do you know? You'll just have to.

M: We could do it on the laptop …

Bryce comes in:

M: How are you going.

WG: Bryce, how are you?

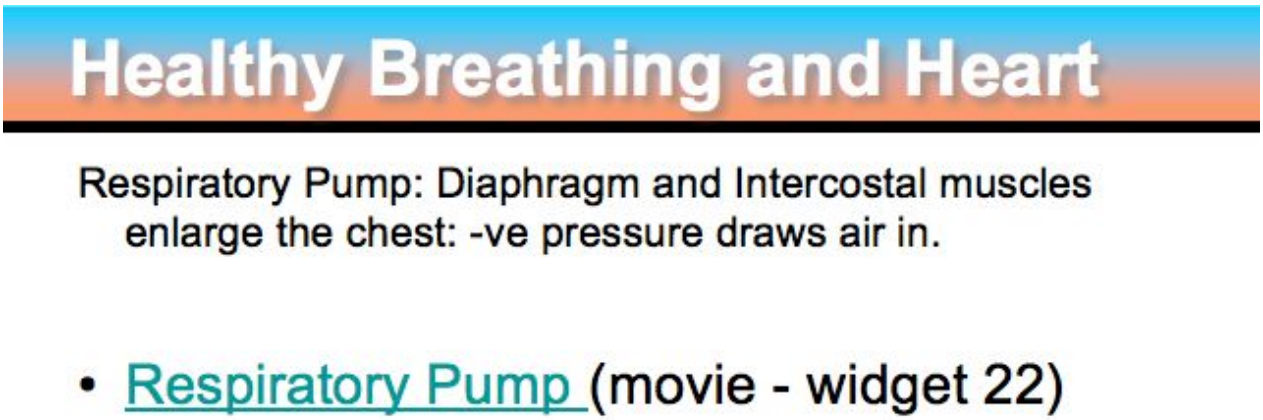
R Have you got any idea?

B: It's more likely to be a problem with the laptop … …

R: Well, we may just have to talk to the screen. Well, that's better.

B: … those movies that don't work properly in power point presentations.

R: All right, can everybody see here? Okay, so here is the chest. Here is the windpipe.



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Here is the lungs, these are the lungs, this is the air going in through the airways. Now, what happens is that when we breathe in, how do we breathe in. This muscle here, this is the diaphragm, okay. Now, the diaphragm is the muscle and when the muscle of the diaphragm contracts.
3744
JG: What do you call that in Yolŋu matha?

Frank: I don't know maybe I'll find out later on…

R: It pushes the belly down and makes the chest bigger. These ones here the white ones, are the ribs in the chest wall. Between the ribs are more muscles and when these muscles

MC: Is it djamurr?

R: contract the ribs move out. So when we breathe in the ribs get bigger and the diaphragm pushes down and that makes a negative pressure inside, so the air flows in, so it's like a pump sucking the air in. So the muscles of the diaphragm and the intercostals muscles between the ribs are like a pump; when they contract they make the space bigger and the air gets sucked into the negative pressure.
3847
?: Like a bicyle pump you pull it and it sucks in air

R: So the concept of how do we breathe, it's a chest is a pump that makes a negative pressure and it sucks the air in. Now, you'll notice when the breathing in happens this gets narrow, because the negative pressure is sucking it closed, sucking it narrower. If the throat and the trachea were floppy they would block off completely so they have to have those tracheal rings to make them strong so it can't collapse down too much.

M: That's why it's like the washing machine pump, it's those rings around the hose.

Dhaŋ; Yes that was what I was thinking of…

R: All right. So this is an animation way of showing the function of how the respiratory pump works. Now, remember this one and I'll show you another one and I want you to tell me which is the best one. … (Discussing laptop) How do you close this?

B: Push escape

JG: Are you happy with the sound rob, I brought a speaker down.

R: No I've got some sound and we'll see some sound in the next one. Is that …?

WG: Yeah. That one there.

R: Okay. Yeah, this one's working now. What's this one. You can hear the breathing. Okay. The diaphragm is pulling down, negative pressure, the air flows in and the lungs get bigger; in, out, in, out. Now, when the diaphragm contracts and pulls down we breathe in; when the diaphragm lets go and it is blocking, we breathe out again. This is

what you hear with the stethoscope on the chest, when the doctor puts a stethoscope on your chest. This is the breath sounds.

(Slow breathing noise).

R: Okay. This person is sitting still, he's standing. What happens when this person does exercise, okay.

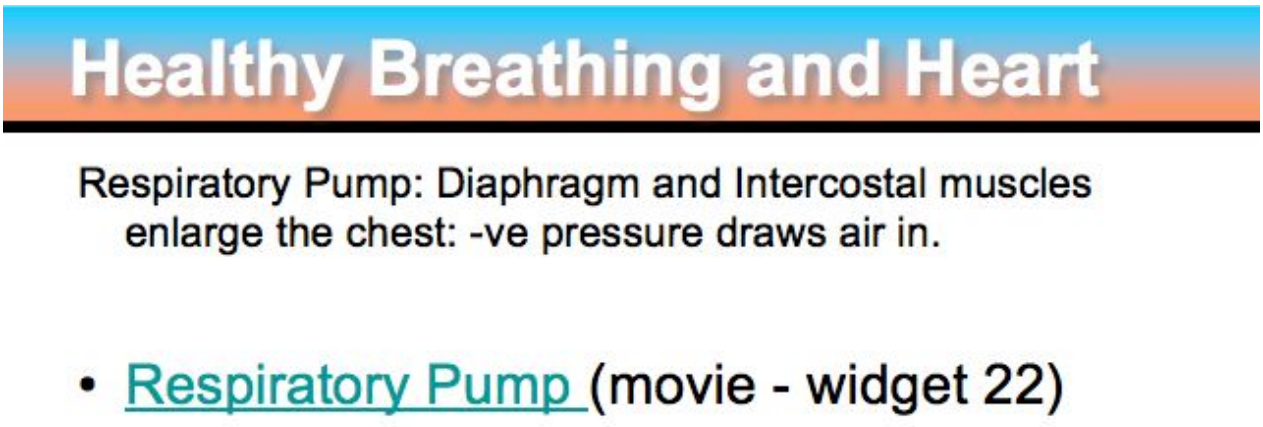
M: There's a yellow bit on the right hand side there.

R: Yeah, I will explain that, okay. So this is the total volume of the lungs, this is the total amount of air inside here, and this part here is just where you're breathing, in, out, in, out. Now, watch what happens when we do exercise.
4214
(Fast breathing noise).

R: Bigger, bigger, breathing gets lower and lower of your lungs. Now, this is another way of showing in a normal person how the pump works and how breathing increases during exercise. And then when you stop the exercise the size of the breath comes down again back to rest.

(Slow breathing noise).

R: So they are two animations for showing how the pump works. Now, the first one, you just watch it, it comes and goes, in and out, in and out.



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This last one that you saw, you have the capacity to make it exercise so you can interact with it, so that's an interactive animation, it's a way of teaching which might be more interesting because you can play with it, or you interact with it, you don't just sit there and watch it.

4359
JG: What do you think?

Dhaŋ: Wait, we're thinking…?? Find the right words to be able to….

(Audio Time Disc 2: 44:12.)

R: So what do you think about that animation way of describing things?

Dhaŋ: It's good. the animation is good for us, (?)

Frank. Well you see that our way I'm trying to explain because sometimes the … oxygen mixes up with normal air and that's just what I heard, so we have to find a way, that's why we want the … doctors to, very very hard to find, they can try to to us communicate, doctors to us… Even we can, bayngu can understand, I can't understand so.
4508
R: Frank, we're going to talk more in the next session about how the oxygen gets into the blood.

F: Yeah, but what I'm saying…

R: This one is just about the mechanical pump function of the lungs.

F: Yo, but what I'm saying is that there again, we are not very clear, because we have a different understanding. Walal. We have to sit down and think … very very clearly what they're trying to get the message across. … what this word animation, or all different sorts of things. . That's where we are different. And we are missing out. That's just what I[m thinking, … so we have to discover something together.
4557
R: Frank, there are reasons why we use this model to explain how the lungs work that are related to all the disease things because one of the problems, one of the causes of all the symptoms in people with chronic obstructive lung disease is that the diaphragm has to work very hard, so unless you understand how the diaphragm contracts like a pump, then you won't understand why it is that smoking and emphysema make people feel breathless, and limit the amount of exercise, stop them from exercising; so you have to have an idea about the pump and how it's the muscles of the diaphragm and the chest wall, that make the pump work, in order to have later on an understanding of what respiratory failure is and why people get very breathless when they've got chronic lung disease. So that's the balanda logic if you like for why this model is important to explain the function of normal breathing.

F: Sorry Rob, I'll just sort of want to comment more. Like I just want to say this everyone, we will all Find out because this is a new thing that I've discovered, new, which I didn't know before, I don't know whether you people knew it, maybe so maybe not, and we need to get that clear understanding what it is that he's saying, … because one, we don't have word, and if we have the word it won't match the medical term, yeah, it won't match. Even you can talk all day, then still they will not know. …

F: I'm just sort of trying to.

R; Yes I understand…

James: 4756 we need to talk about normal heart and follow that idea, then see what happens with exercise, and later see how smoking and other things affect the heart, make (the pulse?) higher or lower

R: Is the concept of a pump familiar in your view, culture?

WG: Can somehow can maybe what can be done to the normal

R: Yes, this is only normal, we're only talking about normal.

WG: Yeah, maybe just thinking about doing one with a problem.

R: Yes, I can do it, later on, I will make this one like a disease one. I can do that.

M: That's number three, after this one, then there's gas exchange, and then there's the sickness (rerri) basically.

R: Can you wait or do you want it now?

?: No, no, no. Just.

Dhaŋ: Okay what is the name of the diaphragm, in Yolŋu? Is it ḏäk?
4929
WG: Because if we wanted to show them the normal one then the one with the problem. Yeah.

Dhaŋ: (spells out ḏäk)

R: (to WG) show them the healthy one, … and then make it diseased.

Dhaŋ: Diaphragm.

R: Well, the diaphragm is like a sheet of muscle.

Dhaŋ: Yeah, we just saying the word for it.

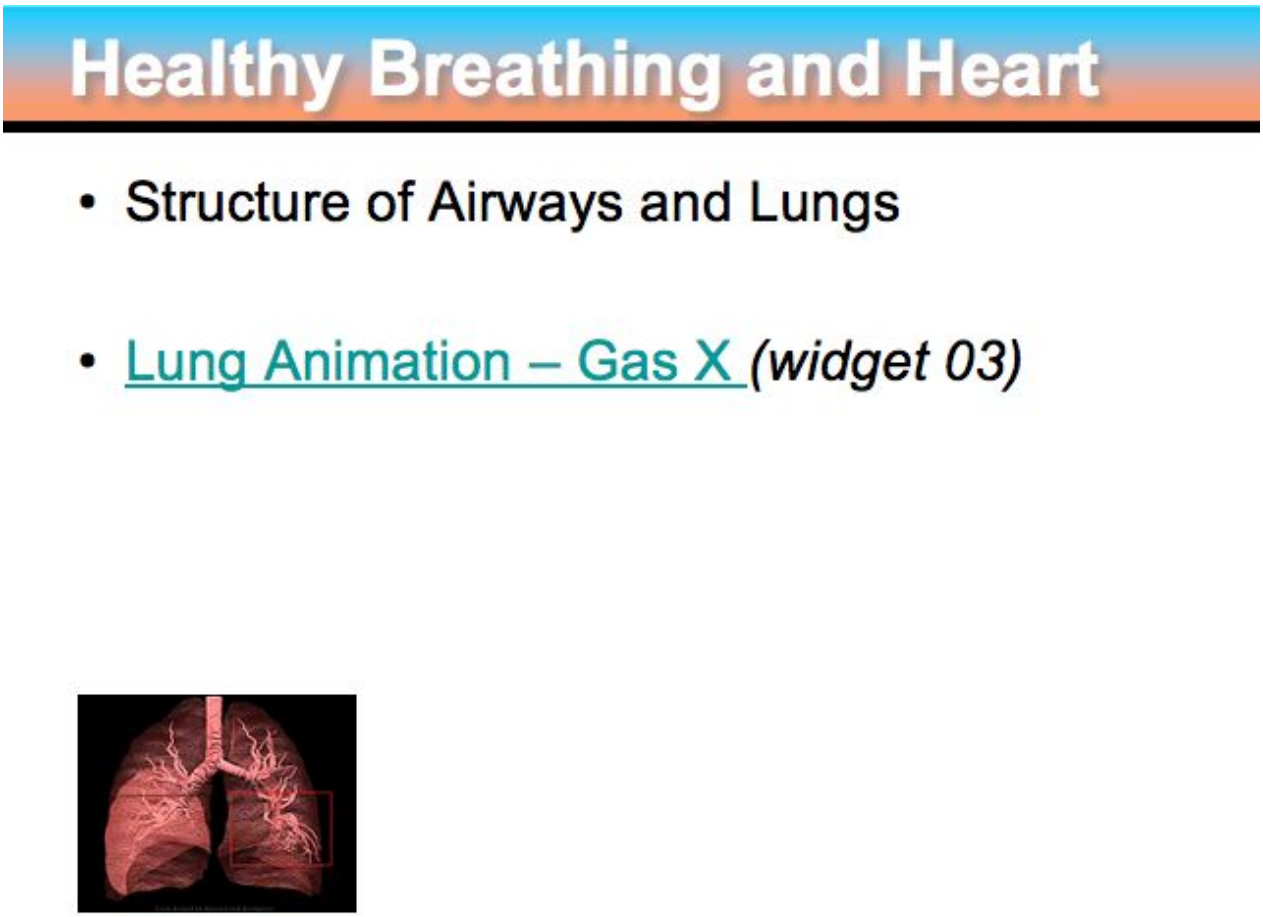
R: And you're familiar with the diaphragm from animals, cutting animals? You've seen the diaphragm? Just a muscle?

Dhaŋ: Yo, yo, yo.

M: That's stage two, that's the gas exchange, yeah.

Dhaŋ and others: come to agreement about ḏäk?

M: Can you just go back to that one with all the …



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R: Yes.

F: It's all right, (YM) … can understand but I find it very hard. (YM) …

Dhaŋ: (YM) … balanda, we can see a different way where they can understand (YM) …]

F: Yo.

R: So this is the diaphragm, it shows the muscle when we breathe in, the diaphragm contracts and because it's this shape, when the diaphragm contracts, it's on the ribs here, it pushes the belly down, okay. It makes a positive pressure here, and a negative pressure here. So breathing in, is active. The diaphragm contracts, strong, strong diaphragm. Breathing out, diaphragm relaxes. When the diaphragm relaxes, the chest wall is springy like elastic, 5145 so the muscles make it big and when the muscles stop it goes down again like elastic. Do you understand that term, elasticity and the chest wall? And in the lungs, the negative pressure stretches the lungs up. When the pressure is breathing out, the lungs come back down. They're like an elastic sponge. So breathing in is active contraction of the diaphragm, breathing out is passive letting go of the …

M: Can I just say one thing, I'll just tell a little bit more about animations. The people that make these things like, there's a place down in Melbourne University where they make the animations, and I don't know how they do it but it's basically just drawing pictures and then drawing a little one and then making them, they do it on the computer so it's not a photograph; that's what it means by an animation. It's like a cartoon that they do like with plastic."
5250

James: (YM) … Okay, so it's for animals or for people so we can explain. You know, if you know that exaggeration(?) thing, but we can explain because it happens to our body.

M: The problem is Yolngu familiar with one more concept.

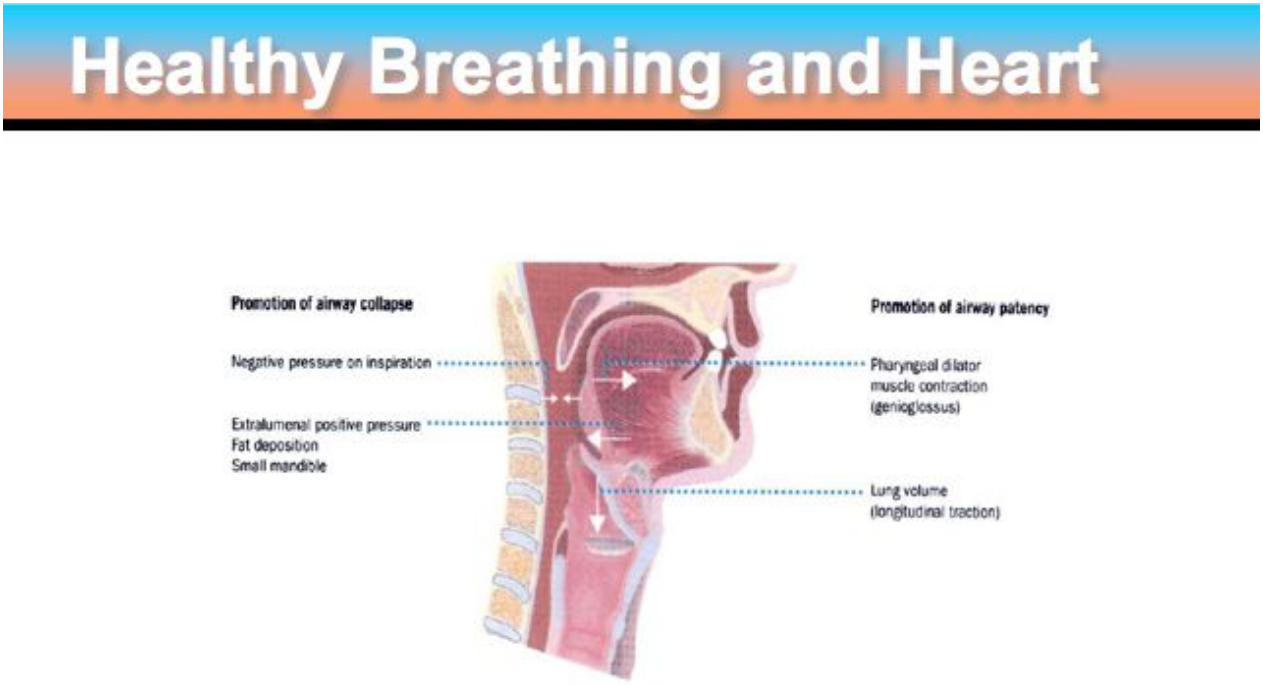
(Audio Time Disc 2: 53:13)

MC: Okay one more thing and then it's time for lunch.

MC: I'm out of breath

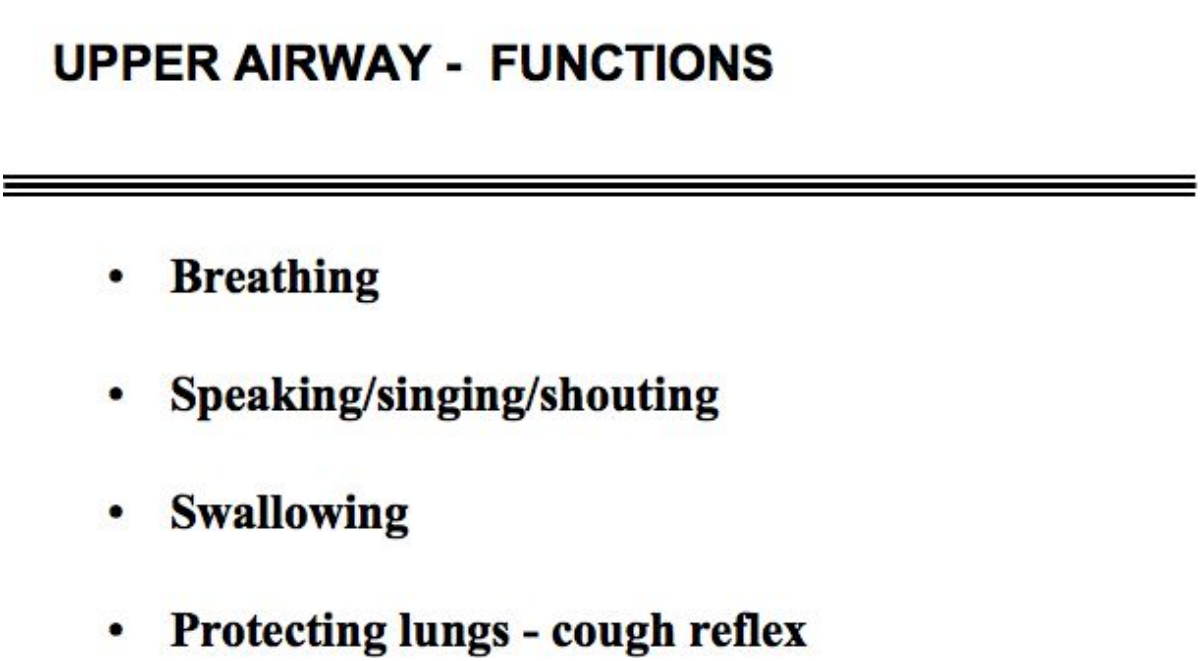
(Laughing)

R: Okay, one more concept. Now we're going to talk about the upper airway, okay.



Powerpoint 1 slide 40 (© American Thoracic Society. Permission granted)

So this one is the mouth and the tongue. This is the nose. This is the throat behind the tongue. And this is the vocal chords and this is the wind pipe or the trachea. This upper air way is a tiny little space; it's about this big, your upper air way. It's very, very important because you need it for breathing,



- **Yidaki – circular breathing**

many sets of muscle under fine control

Powerpoint 1 slide 41

you need it for speaking, you need it for swallowing, singing, blowing, many different things. And it's very important that you are able to separate things so that when you're swallowing the food goes down the gullet, the esophagus, and it doesn't go into here because that would be very bad. So your upper air way is a tiny little space but it has very complex integrated functions to do; so it has many sets of muscles. So that when you swallow, this one pulls up here and blocks off the trachea so that the food can't go down into your larynx, it can only go down the back. And you have little muscles that control the vocal chords for speaking.

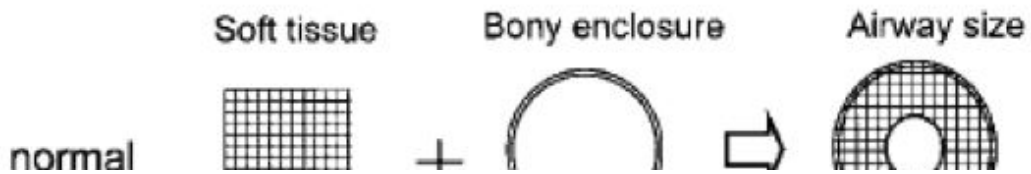
Healthy Breathing and Heart

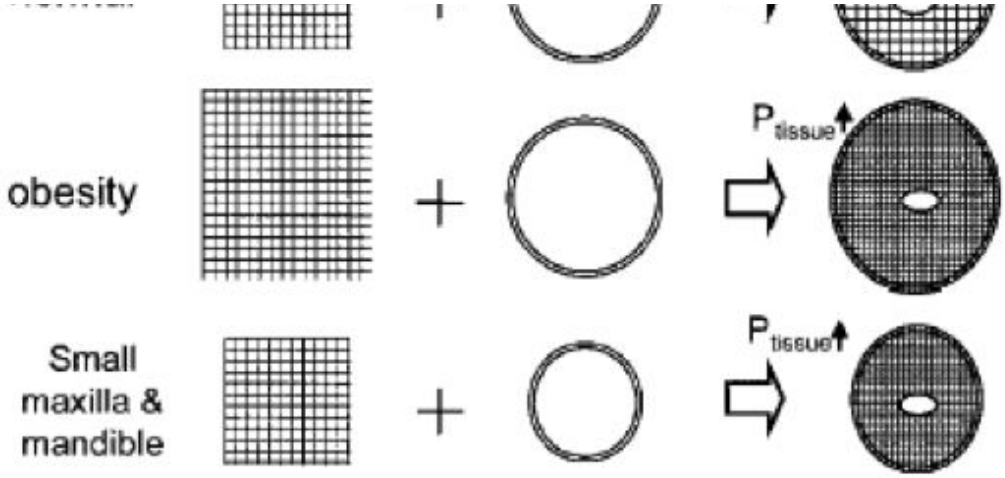
Larynx or Voice box – airflow vibrates cords to produce sound/voice

Powerpoint 1 slide 31 (Attributable to Rob Pierce)

They make the vocal chords narrower so that you can make the sound; when you blow the air out through those vocal chords, they vibrate to make the sound. So there are many little sets of muscles here. And there are a couple of things to say that this upper airway is like it's sitting inside a box.

Healthy Breathing and Heart





Powerpoint 1 slide 42 (© American Thoracic Society. Permission granted)

Now, it's surrounded by bones. At the back this is the spine, this is hard bone; in the front there is the jaw bone, strong; in the top there is the hard palate, okay. So this is a bony box and it's got this air way running through the middle. Now, so there is a bony box and inside the box there's a whole lot of soft tissues, the tongue and the side walls, okay, and the soft palate, and you've got to put all that in there and then there's a hole left over. This is the upper air way that we're breathing through and speaking. And this is normal, okay. Now, people who are over weight or obese, they have a lot more soft tissue. You'll notice that many people who are obese are big here, aren't they. Lots more soft tissue and fat. So in obese people there's more soft tissue and it has to fit inside the same bony box, so it squashes the airway down, so being an obese person it makes your upper air way very small because there's a lot more soft tissue in there. Now, some other people for reasons for family and congenital reasons have a relatively small jaw. So if you have a small jaw, the bony box is smaller, and even if you've got normal soft tissues it makes a small air way inside. So this is a normal upper air way but it will be small in people who are obese or people who have a small jaw bone. Now, this is important because if your upper airway is narrow it's more likely to block off.

Healthy Breathing and Heart

DISCUSSION:

Value of animations, microscope photos, bronchoscopy video/photos, STTS pictures

Which give the best explanation of breathing

Value of more complex concepts – Pump, work, effects of sleep

.

Value of metaphors – hollow tree, termites, sap

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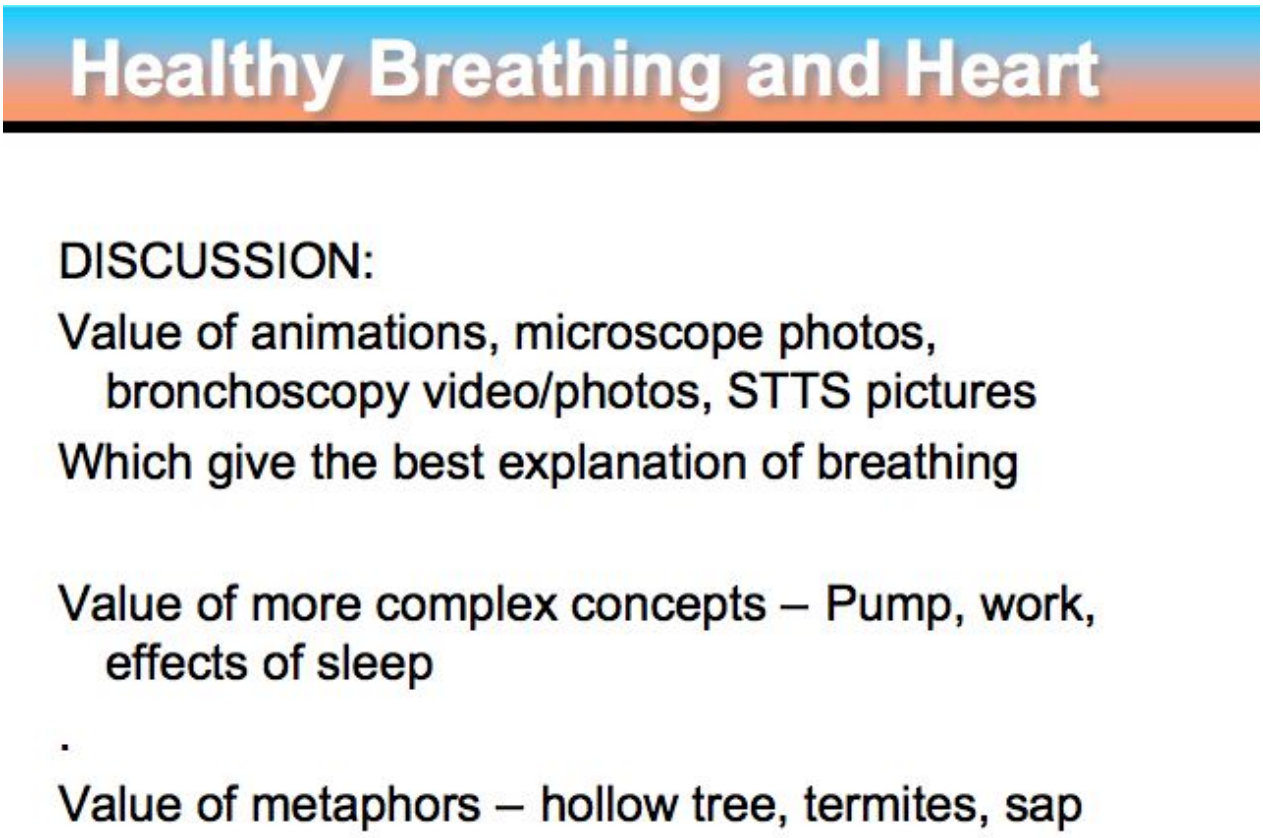
One of the ways in which going to sleep affects the breathing is that all the muscles that hold the upper air way open go floppy when we go to sleep. When you're awake the brain keeps all these dilated muscles active holding the upper airway open. So when we go to sleep, the stiffness disappears because the muscles relax and the upper airway goes floppy. And therefore it's more likely to be sucked closed. When the negative pressure is inside for breathing in, it will collapse, okay, in sleep. It is more likely to collapse when you are asleep than when you're awake, and that's what snoring is, it's people who have a narrow upper air way which goes floppy when you're asleep and it blocks off.
5932
(Someone snoring. Laughter).

R: Now, that's very bad for the body because the breathing is blocked so you can't breathe in air and oxygen so the amount of oxygen in the body and the blood goes down, and that has bad effects on you. It causes a strain on the heart, it also causes your brain to wake up when, the brain has an alarm mechanism so that you wake up when the oxygen goes low; so people who are obese or who have a small jaw or snore a lot and their breathing will block off completely when they go to sleep, and that's what we call sleep apnea. So they have periods where they go to sleep, their upper air way blocks off, they're still trying to breath, the diaphragm is contracting, but the air can't flow in because the upper air way is blocked. So the oxygen is falling, trying to breathe and then the brain senses the low oxygen and (snort), a big breath, and then they'll breath again; and then they go back to sleep, snoring.

R: Blocked, blocked, blocked. Arouse it again. So they have a cycle of breathing and stoppage and that's called sleep apnea or snoring, and it's bad because your sleep is very messed up and fragmented and the low oxygen is bad for your heart. So okay, this is very common.



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