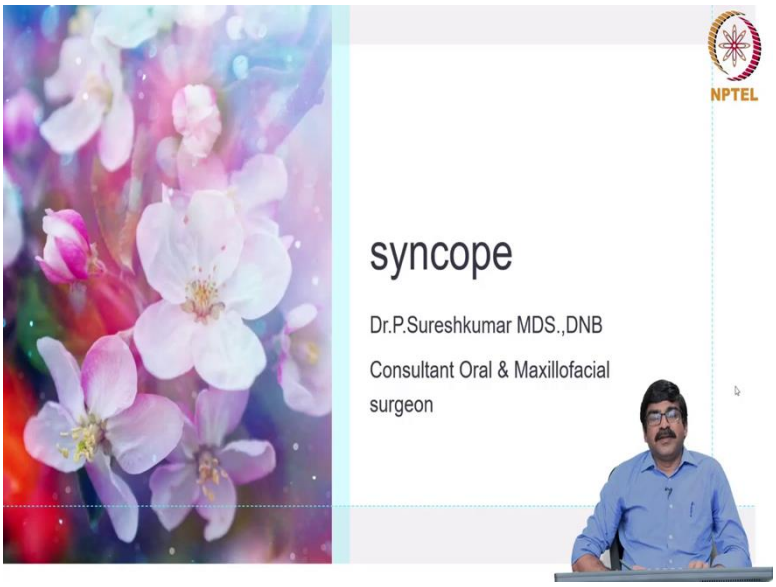
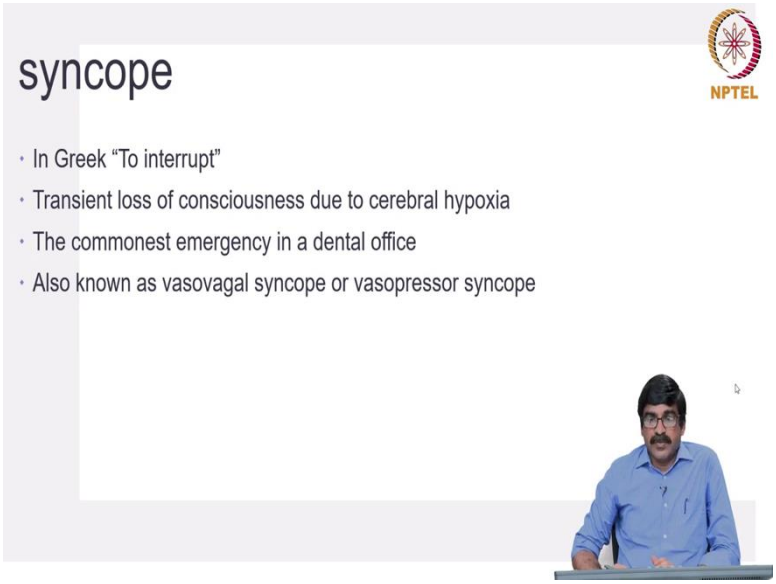
Management of Medical Emergencies in Dental Practice
Professor Doctor Suresh Kumar
VASOVAGAL SYNCOPE

(Refer Slide Time: 00:18)



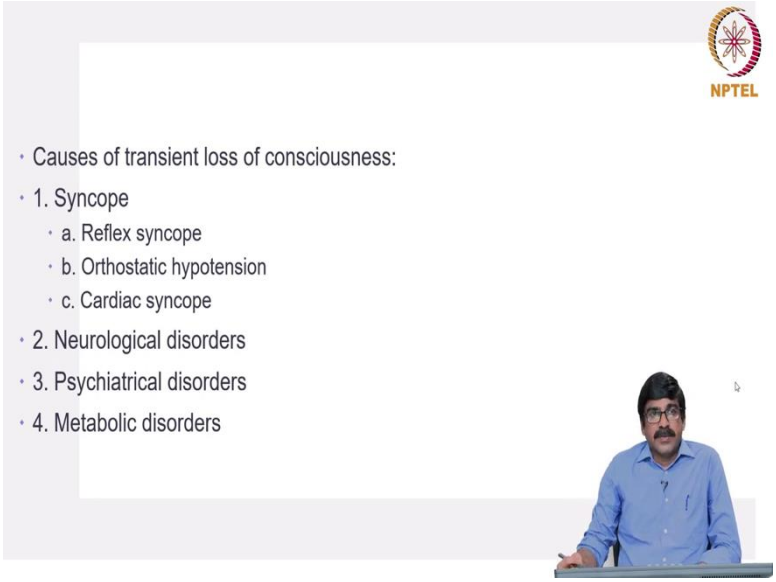
Hi everyone. We are going to discuss an important topic in dentistry, which is syncope. Every dental specialist and dentist should be aware of, what is syncope? How to prevent it? How to treat it? Because this is a very common complication that can happen in a dental office. And I am sure you are all aware of it, because we do see this right from the day one of your clinical postings, that is from the third year BDS onwards, we see a lot of people fainting in when you do the treatment irrespective of the department, more commonly in oral surgery.

(Refer Slide Time: 01:02)



What actually is the meaning of syncope? Syncope in Greek language means to interrupt, that is a normal phenomenon is happening and when there is a sudden interruption, they call it as a syncope. So, here in dentistry, syncope means transient loss of consciousness due to cerebral ischemia that is there is less blood supply to the brain. The commonest emergency that can happen in a dental office is syncope as you all aware. You can also name it in other terminologies like vasovagal syncope or vasopressor syncope.

(Refer Slide Time: 01:42)

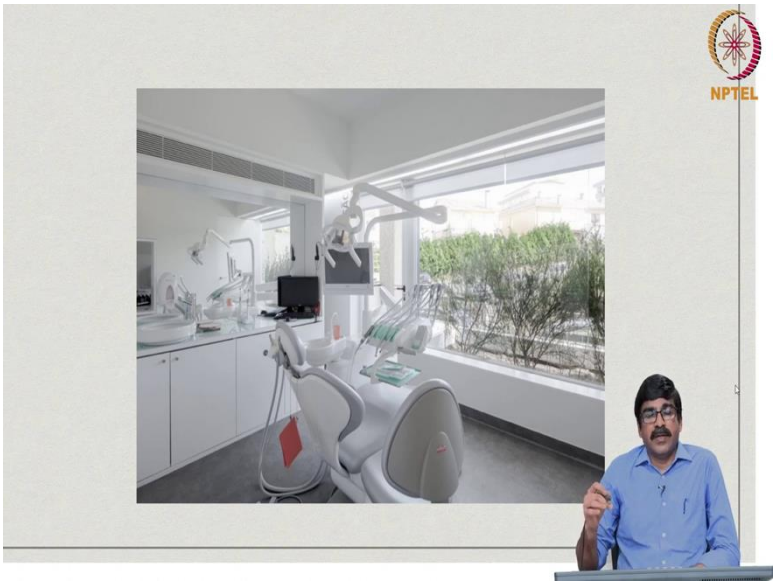


So, syncope is not the only reason why the patient loses consciousness in your dental office, there are also other causes. So, when the patient faints in your dental office, you should be aware of the reasons then only you can diagnose and treat that particular reason which has

caused unconsciousness to that particular patient. So, it can be due to a syncopal attack or it can be due to neurological disorders or it can be due to psychiatric disorders, or it can also be due to metabolic disorders like diabetic coma, and diabetic ketoacidosis, etcetera.

So, the commonest cause leading to loss of consciousness in dental office is syncope. In the syncope, also we do have subtypes like it can be caused by a reflex and so it is known as a reflex syncope or it can be orthostatic hypotension which can lead to loss of consciousness or it can also be a cardiac syncope. That is when the patient has a cardiac problem like bradycardia, arrhythmias, congestive cardiac failure, then the patient is very much prone for developing a syncope during your dental treatment. So, these are the types of syncope you should be aware of.

(Refer Slide Time: 03:05)



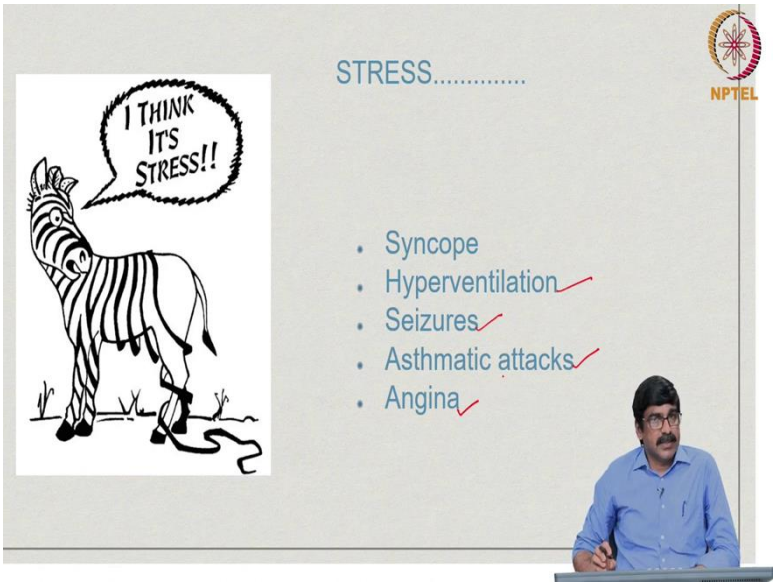
But one good thing about syncope is it is a very, very preventable complication. That is when you make your dental clinic atmosphere very pleasant like this, what you see in the photograph, when the patients are not so anxious, very comfortable during your approach and treatment, there is very less chance for developing a syncope.

This is the reason why you see a lot of syncopal attacks in your institutions, and very less than syncopal attacks in a private dental clinics. Because in the institutions, it is always overcrowded and you are more focused in learning and not giving attention to the patient too much. So, it is more common in dental institutions. When you become more familiar with the procedure, you are more confident to treat them. So, in your dental private practice, you are not seeing so many syncopal attacks.

(Refer Slide Time: 04:04)

And if your clinic is well equipped with certain equipment like oxygen cylinders and other gadgets, it is also easy to tackle a syncopal attack. So, it is both preventable and treatable very easily.

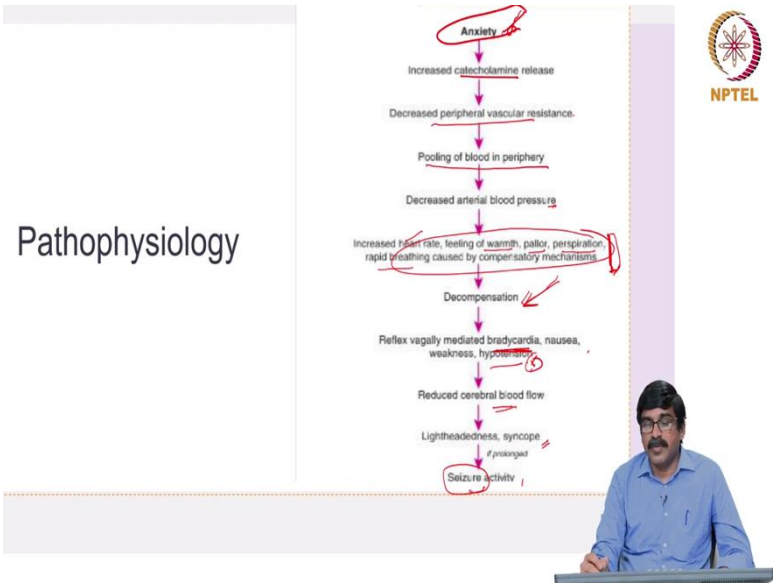
(Refer Slide Time: 04:18)



That is the advantage of syncope as a complication. So, before going into the syncope; the topic assets, let me discuss a little bit about the stress factor. Because in dentistry, stress is the initiating factor for so many complications. It may be simple like a syncope or it can lead to more severe complications like say hyperventilation or the patient can develop seizures or epileptic attacks because of the stress factor or the stress can initiate an asthmatic attack.

You all know asthma can be triggered by pollution the dust in the dental office or wherever. The another important factor that can initiate an asthmatic wheezing is the stress factor. So, stress caused by your dental procedure in dental office, dental instruments can initiate an asthmatic attack. Sometimes it can also initiate a very serious complications like angina pectoris. So, if the stress is not handled properly, we can end up in a lot of complications in our dental office.

(Refer Slide Time: 05:31)



So, what happens in syncope, what is the pathophysiology. As we just discussed, the problem, all the problems start from the needles of anxiety and anxiety is the basic thing which leads or which starts the cascade of reactions ultimately ending up in loss of consciousness or syncope.

So, when there is anxiety, naturally, the patient will tend to secrete more catecholamine or adrenaline. So, there are a lot of actions of adrenaline in the body. One important action here related to syncopal attack is decrease in the peripheral vascular resistance. So, the vasculature in the extremities are very, very relaxed. So, they do not contract, they do not send the blood back to the heart.

So, there is lot of blood that is pooled in the periphery, periphery, meaning the extremities, that is the legs and the hands, that is you have more blood stored in the leg and hands, they are not returning back to the heart, only when the heart gets back the blood, it can pump out to re-circulate all over the body including the brain. So, lack of vascular resistance leading to pooling of blood in the periphery.

And this leads to decrease in the arterial blood pressure that is the BP falls down it is low now. So, because the BP is lowered, the body has its own mechanisms, which will try to counteract these problems. So, otherwise, in other words, it activates the sympathetic system, nervous system, what does the sympathetic system do? It will try to increase the heart rate, so that more blood can be pumped to the brain.

This is the time the patient starts feeling a kind of warmth, the feeling of warmth, the patient looks paler and the patient will be sweating that is there is a lot of perspiration. And the rate of respiration also is increasing, there is rapid breathing, all this is because of stimulation of the sympathetic nervous system caused by the anxiety. This may be looking little bad for the patient.

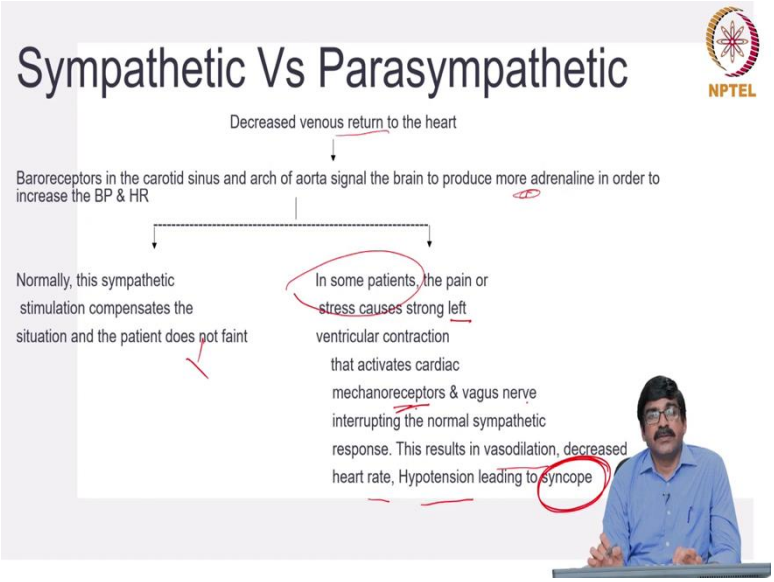
You think the patient is suffering, but it is a good thing for the patient, these mechanisms are trying to increase the blood supply that can be supplied to the brain. Sometimes it is successful, but a few times they are not successful that is the stress factor or the anxiety is much more and so the sympathetic system fails to restore the crisis. So, what happens there is another system in the body which will try to come in and causes decompensation, sympathetic system will try to compensate the crisis, but the other system will try to decompensate.

What will happen here? Basically, there is a reflex mediated bradycardia which is not good for the patient, the patient has a lot of other symptoms like nausea, weakness, or hypertension, which is very important. So, already the heart does not have blood to supply to the brain and also the pressure goes down so that even if it pumps the pressure is less and nothing reaches to the brain. So, it is bad situation now.

So, sympathetic system comes for help, but when the stress factor is too very strong, the sympathetic system is not able to counteract and so the parasympathetic system or the decompensatory mechanisms will come in causing bradycardia and hypotension. So, what will happen if there is bradycardia and hypotension?

The blood supply is further reduced to the brain, there is reduced cerebral blood flow leading to light-headedness, the patient still is more weaker, and the patient starts developing the syncope or loss of consciousness. So, if the syncope or the loss of consciousness is not treated adequately, or sooner than the patient also can develop a seizure activity, the patients will develop epileptic seizures in the dental chair, the seizures. This is not epileptic seizure. This is seizures caused by hyperglycemia or hypoxia.

(Refer Slide Time: 10:07)



In other words, if it needs to be explained, the syncope is basically a fight between the sympathetic system versus the parasympathetic system. So, whenever the stress factor is leading to decreased venous return to the heart, as we just saw, what happens because the BP is lowering, there are baroreceptors, which are meant for recognizing the blood pressure which are present in the carotid sinus and in the arch of aorta.

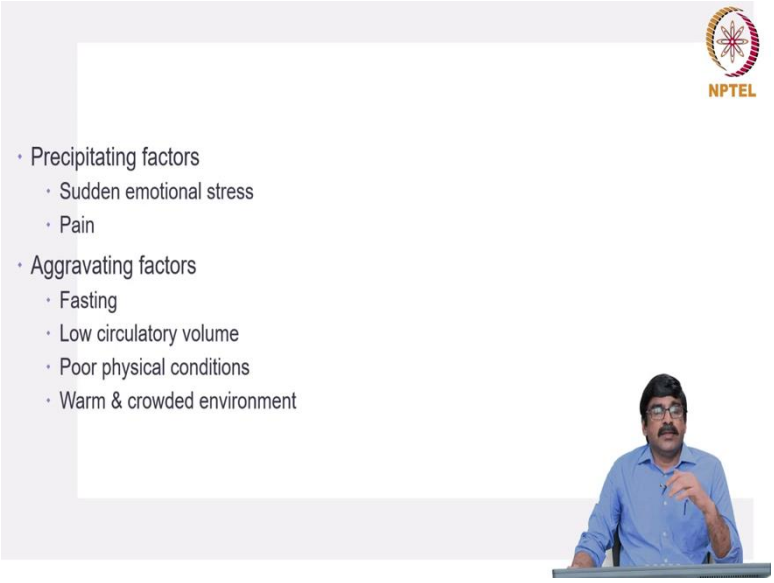
The baroreceptors will get stimulated when the BP goes down. So, they in turn will signal the brain to produce more adrenaline in order to increase the blood pressure and the heart rate. So, that the body thinks if we increase the blood pressure, if we increase the heart rate, we will be able to supply more blood to the brain. So, one good thing. So, normally, what happens this sympathetic stimulation will compensate the crisis or the situation and so the patient does not faint.

The patient has started sinking at this stage, but the sympathetic system has overcome it and the patient is saved, there is no fainting here. But in some patients, this sympathetic system is not adequate to counteract the crisis and so they faint. So, what happens here the stress factor or the anxiety is too severe, what happens is the left ventricle undergoes a severe contraction stimulating the mechanoreceptors in the cardiac walls and the vagus nerve.

So, what is the function of these mechanoreceptors and the vagus nerve? They are the mediators of the parasympathetic system. So, the parasympathetic system now will come into picture they will interrupt the normal sympathetic response. So, this is nullified, now only the parasympathetic system is going to take over.

So, whenever the parasympathetic system is activated, it causes more vasodilatation and decreased heart rate and more severe hypotension. So, which are not desirable at this stage. So, all these are adverse, in fact. So, finally, all these effects parasympathetic effects will lead to syncope and the patient faints on the dental chair losing the consciousness level.

(Refer Slide Time: 12:30)



So, you can ask me like why not all the patient are fainting in the dental chair, you see a lot of patients every day, most of them are okay, you do a treatment they go back safely and happily home. But some of the patients are not able to withstand the stress, they are the ones who faint caused by the syncopal attacks. So, these patients show some precipitating factors in them or aggravating factors which will lead to syncope in them.

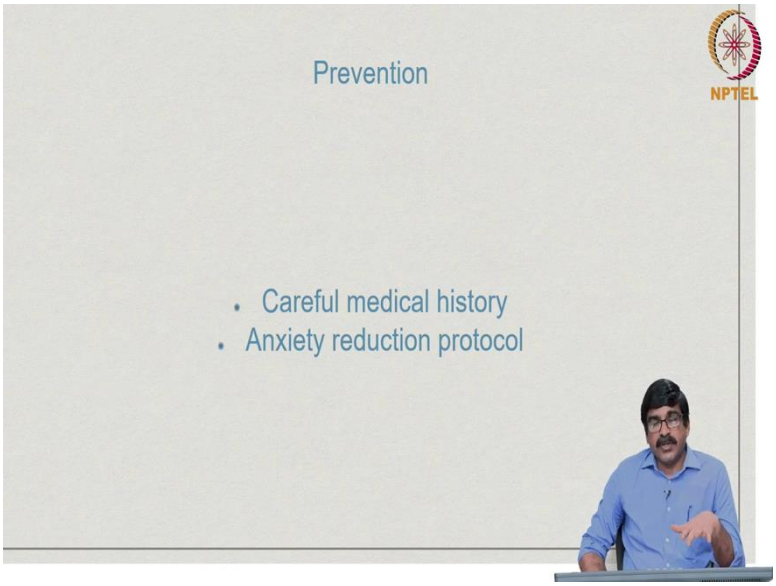
What are the precipitating factors? Precipitating factors are mostly dentist related. So, if you cause more emotional stress, that is when you are treating a patient if you do not explain the procedure properly, do something without informing the patient or do multiple procedures at the same time continuously without giving rest to the patient, these things can lead to syncopal attacks.

Or if you have not controlled the pain adequately with your local anaesthesia, this pain will induce more anxiety and stress leading to syncopal attacks. These are the precipitating factors. The aggravating factors are most commonly related to the patient. For example, if the patient has not taken any food in the morning coming to the dental treatment, he does not have enough blood glucose level to tolerate the stress.

So, stress is mounting more and more lead into syncopal attack. So, fasting patients, low circulatory volumes, sometimes patient has some issue in the body, medical problem, so that there is less circulatory volume in the blood vessels. So, these patients are also prone for this kind of syncopal attacks.

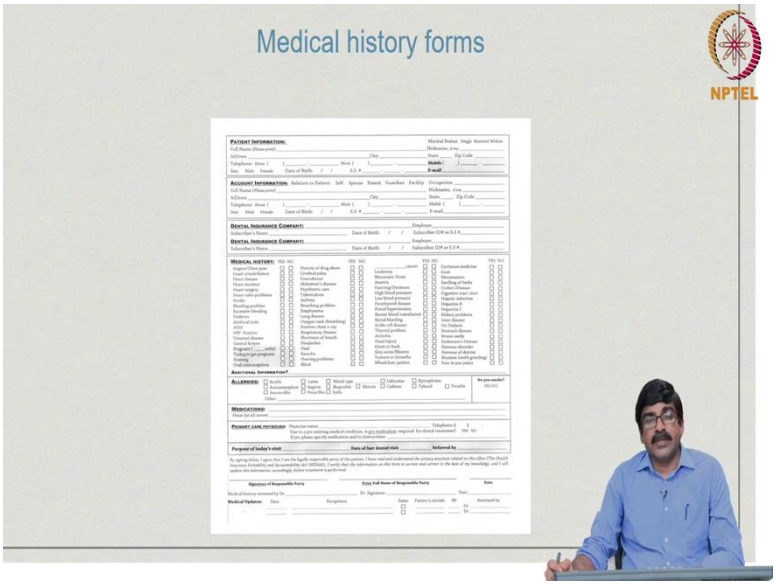
And poor physical conditions like thin build patients, malnourished patients, uncontrolled medical issues, medical problems, these patients are also prone for syncopal attacks. And sometimes the atmosphere is not very conducive for the patient is very warm, and to too much crowded, multiple people around the patients all these things will make them very, very uncomfortable. They are anxious, they are stressed and they can undergo a syncopal attack.

(Refer Slide Time: 14:48)



As we just saw, prevention is the best thing in syncopal attacks and it is possible. So, how do you prevent a syncopal attack. Even before starting your career dental treatment, if you do careful medical history taking and if you know what is anxiety reduction protocol, it can be easily prevented.

(Refer Slide Time: 15:09)

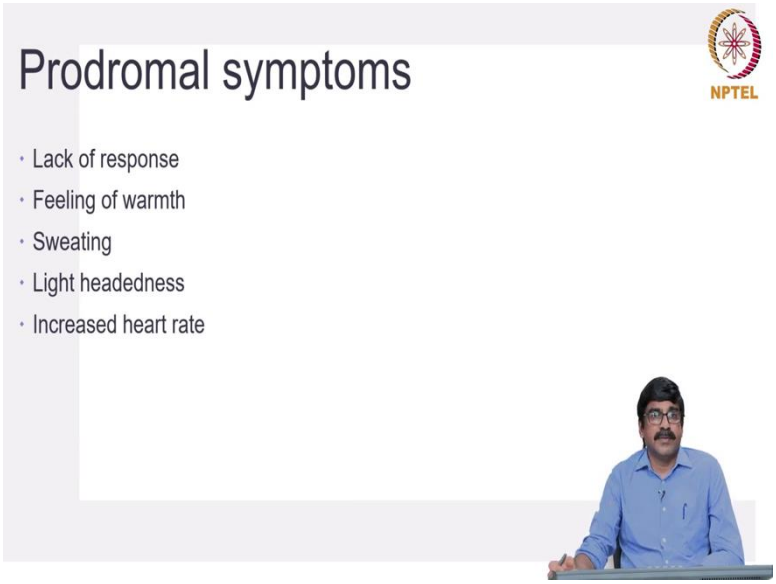


So, how do you explore the medical history in a patient like it is almost impossible to make a patient sit down in front of you and to ask all the medical illness whether you have diabetes, hypertension, cholesterol, have you undergone a cardiac surgery, bypass surgery or any neurosurgery, do you have any thyroid problem, any other hormonal problem, any history of trauma, or are you on any medications, so many things are there in the medical history.

But if you have a printed form like this, which will mention all the diseases, the patient just has to put a tick against the yes or no. So, the patient finishes this in 5 to 10 minutes maximum, and for you to go through this again, it takes only 5 minutes. So, there is more clarity here and with less spending of time. So, within 10 to 15 minutes, you are able to grasp all the details about the medical problems of a particular patient.

So, it is very, very useful to have this form in every dental clinic, have it printed, give it to a patient whoever comes to your clinic for the first time. Of course, you save this so that when the patient comes second or third time to your dental office, you go through this once again. So, that you will remember oh, this man had this problem. So, we have to take this precaution. So, this way, if we know the medical history of a patient, the syncopal attacks can be prevented to a larger extent.

(Refer Slide Time: 16:38)



So, some of you have missed our we have thought this patient is a good patient, he is not undergo a syncopal attack. Still when you start your treatment, there is another stage where you still can recognize the patient is developing a syncope and you can prevent the further consequences. This is called a prodromal symptoms prodromal stage, what happens here is the patients response is going to be a little bit poor, there is lack of response.

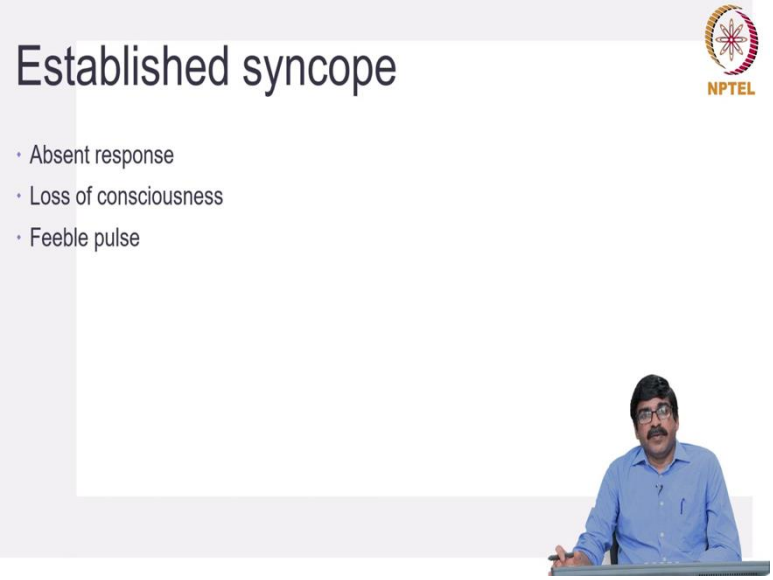
You will be instructing the patient something but the patient wo not be able to follow your instructions that shows there is lack of response. And the patient says there is a feeling of warmth all over the body that is sympathetic stimulation and so the body feels warmer. And because of sympathetic stimulation, there is sweating more sweating in the body and the patient feels because of reduced blood supply to the brain there is light-headedness.

And if you check the heart rate, the compensatory mechanism will make it more so there is increased heart rate at the prodromal stage. So, this is the stage where you have to recognize. So, do not focus only on your instruments and your treatment, always have a look on the patient's general condition also.

Sometimes you will be busy, mixing cement or making instruments ready for your extraction, checking with the nurse whether everything is ready or we start the procedure now or something is needed to arrange instrument trolley etcetera, etcetera. So, always have an eye on the patient like whether he is looking straight at you, is he talking to you, is he replying you, is he listening to your instructions?

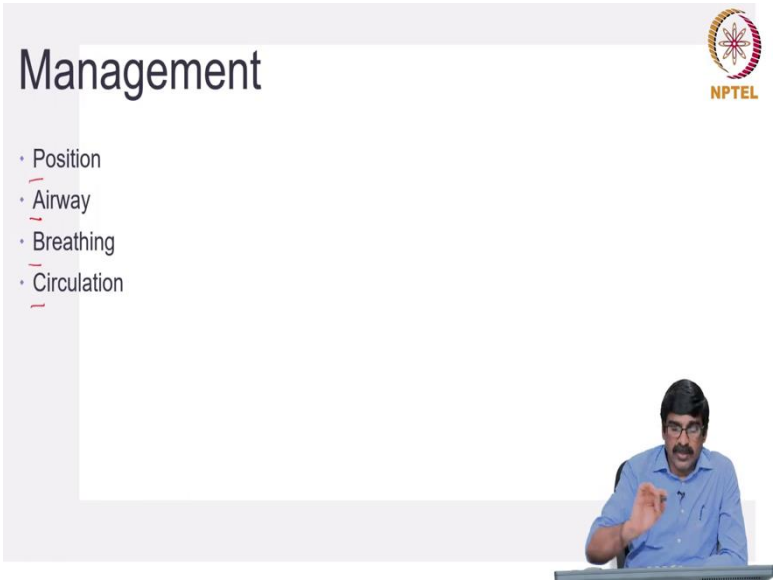
So, just have a constant watch, I mean, you do not need to keep asking the patient are you feeling alright, you can just see, assess the patient continuously. So, that even if there is any slight change like when they are not looking at you, when they are not listening to you, when they are not following your instructions, you know there is something wrong which might happen. So, you can be more alert this way.

(Refer Slide Time: 18:50)



But if we somehow miss the prodromal stage the patient will pass on to the next stage that is the developed or established syncope stage that is there is no response from the patient, the consciousness is absent and the pulse is very feeble, there may or may not be hypotension. So, now the patient is fainted totally, which we call a syncope. This is the stage, last stage of syncope. If we miss the prodromal stage we will end up in this stage.

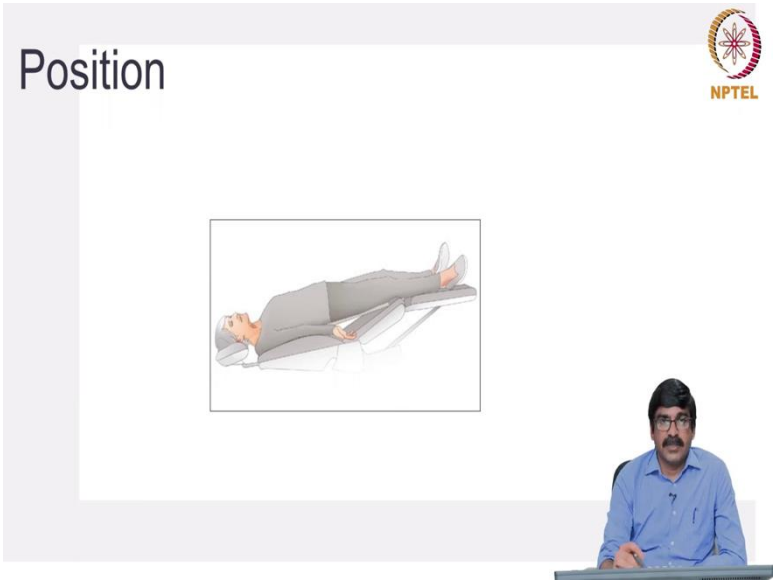
(Refer Slide Time: 19:20)



But as we know like it can be easily prevented, the syncope complication can easily be managed too, that is the advantage of this particular complication. Management is taught very well, every dentist knows we are only brushing up here. The management comprises four portions, one is position, airway, breathing and circulation, PABC. So, in this order, we will have to follow like make the position all right for the patient so that there is more blood supply to the brain.

And make the airway atomically patient and make sure the patient is breathing on his own otherwise we will be able to help the patient for breathing. And many of the patients who have already fainted will have a low circulatory volume. So, try to give some IV fluids to improve the circulatory volume.

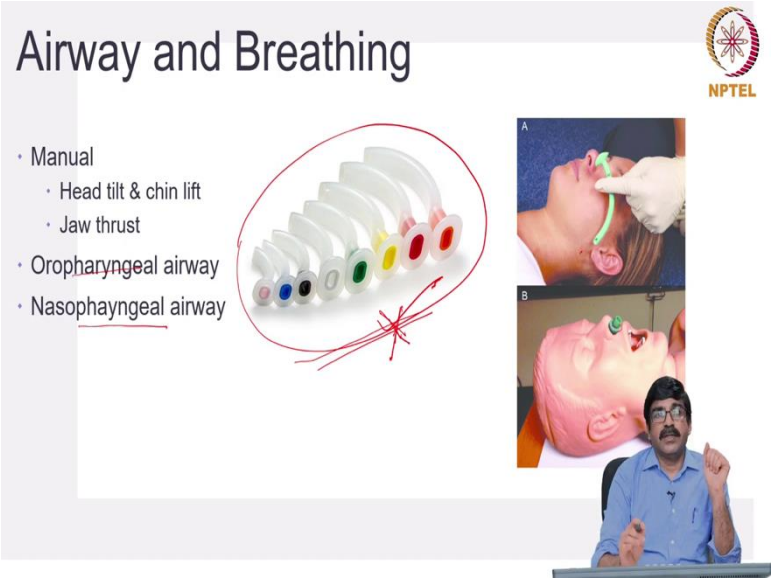
(Refer Slide Time: 20:16)



So, let us see one by one. This is the position, this is called a Trendelenburg position where the dental chair is reclined so that the brain will be lower compared to the heart level, so this is lower by about 15 to 17 degrees. And same with the feet are elevated up so that by gravity, there is more venous return of blood to the heart. And because it is at a lower level, the brain is at a lower level, the heart can easily pump blood to the brain because there is no gravity acting here.

So, this is Trendelenburg position, which is the first one to be done when you recognize a syncope, just make the patient in Trendelenburg position. That is the reason why the dental chair is so beautifully designed to adjust or bring the patient to this position within 10 to 15 seconds. Most of the patients will recover with the position change itself, mostly 90 percent and even more. Because it is a very transient problem, the recovery is very faster. The moment the patient gets more blood supply to the brain, the syncope is reversed.

(Refer Slide Time: 21:29)



And after the position is changed. The next thing to be confirmed is the airway and breathing. So, what is the difference between airway and breathing? The airway is related to anatomical issue like we have to make sure that the anatomical airway is patent made, kept patent. Breathing is physiological. So, after making the airway patent make sure that the patient is breathing normally, physiologically.

To restore the airway anatomy, we have certain procedures or some gadgets. Most of the times the manual procedures are more than adequate to restore the anatomy of the airway. So, we have some simple procedure procedures like head tilt and chin lift position a maneuver or jaw thrust maneuver, which can restore the or increase the airway, the volume of the airway.

What is the head tilt and chin lift position? After syncope, generally what we see is flexion of the neck like this, which will compress the airway or the nasal pharyngeal and oropharyngeal level. So, even if the patient tries to breathe in air, because of the obstruction in the inlet here, it does not go inside in a required quantity. So, immediately what is supposed to be done is change that is the neck has to be extended by tilting the head up.

So, head tilt, and chin lift, the chin can be lifted up or brought anteriorly by using two or three fingers behind the chin, and slowly bringing the or pulling the chin up. So, this is head tilt and chin lift maneuver which will increase the inlet of the airway. So, that is a good step, very easy to be done. And to a large extent it is more successful also. In some patients who has lost consciousness, this may not be very good in restoring the airway.

So, here you can try another manual procedure which is known as jaw thrust procedure. That is, we have to keep two fingers behind the posterior border of the ramus of the mandible region, and then dislocate the mandible bring it forwards. When you do this maneuver, the attachment of the muscles on the lingual side along with the tongue everything will be brought anteriorly so that the laryngeal inlet or the oropharyngeal inlet will be wider that is more opportunity for air to enter, the patient feels easy to breathe.

These are the manual procedures which can be done to make the airway patent. These are the first thing to be done also. Sometimes manual procedures do not come to help and they are not successful. So, what is supposed to be done, we have to have certain gadgets which can be used to restore the airway or the gadgets to open up the airway. Number one is oropharyngeal airway. Number two is nasal pharyngeal airway. Both are having the similar mechanism. There is a very small difference.

So, what you see here are the oropharyngeal airways. They are a gentle S-shaped tubes, which can be placed in the mouth, which will extend till the oropharynx. And the main function of this oropharyngeal airway is to relieve the obstruction between the posterior part of the tongue against the pharyngeal wall because when a patient false conscious like this, when the neck is flexed, the tongue is pressed against the posterior pharyngeal wall, so that air cannot enter, but when you place this oropharyngeal airway, then this obstruction is relieved you have a tube which is intact now.

So, select one appropriate size from these assorted tubes and use it for one particular patient. But you should always have these things in your dental clinic as an emergency, for an emergency measure, they are not very expensive, the whole kit might cost you around 400 to 500 only and you can very well store this in your dental clinic so that you can easily manage the obstructed airway due to syncopal attacks.

Then the second gadget is the nasopharyngeal airway, nasopharyngeal airway is more of a flexible, these are rigid silicone tubes, they are flexible rubber tubes. So, because they are to travel longer and a more curved pathway has to be travelled. So, they are made up of soft flexible rubber. Again, we have various sizes and lengths in nasopharyngeal airways. So, you take a nasopharyngeal airway and approximately just try outside the face, the nasopharyngeal airway must run from here to the oropharyngeal area.

So, that is the size which will suit that particular patient. And it can be inserted like this. After lubrication of the tube, insert it through one of the nostrils, till the end comes, the stopper end

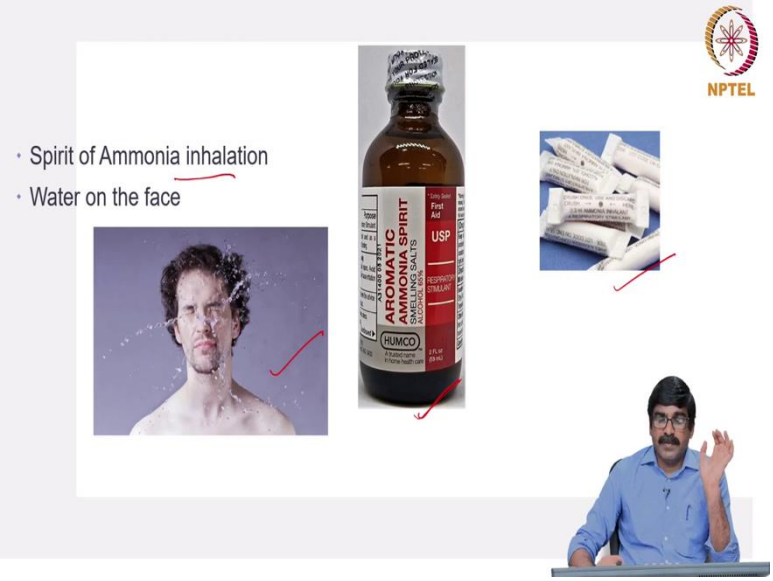
comes to the ala of the nose, this is how the nasopharyngeal airway is used. So, you can have a doubt whether both are same, are they interchangeable, the mechanism is the same, but the indication is slightly different, because that depends upon the conscious level of the patient.

If you have a patient who is slightly conscious that is the patient is talking to you a little bit slightly oriented or if the patient is very much agitated, like they are struggling for breath and they want you to help very badly, they are shouting, screaming for air. So, these patients will require the nasopharyngeal airways because the oropharyngeal airway will cause a lot of gagging sensation in the throat.

And so, if the patient is slightly conscious, it is very, very difficult to tolerate. So, these are meant for patients who are totally unconscious. When the patient is not at all responding completely unconscious, then try to use an oropharyngeal airway. But if the patient is having little bit of consciousness, then better to use a nasopharyngeal airway, because you do not have much of gagging sensation.

Of course, it causes a little bit discomfort in the nasal mucosa all that is true, but that is a negligible factor to be considered here, just insert and make the airway patent, the patient starts breathing without much of gagging reflex because it does not touch the posterior part of the tongue. So, indication is slightly different between oropharyngeal airway and the nasopharyngeal airway, try to remember.

(Refer Slide Time: 28:13)



And apart from these airway breathing circulation things we also have certain commonly used procedures like use of spirit of aromatic ammonia, like the spirit of aromatic ammonia is

available as a solution in bottles or in some countries it is also available as vapor rolls. So, in India, most common preparation is this solution and it is very economical also, every dentist should have this aromatic ammonia spirit solution in the dental clinics.

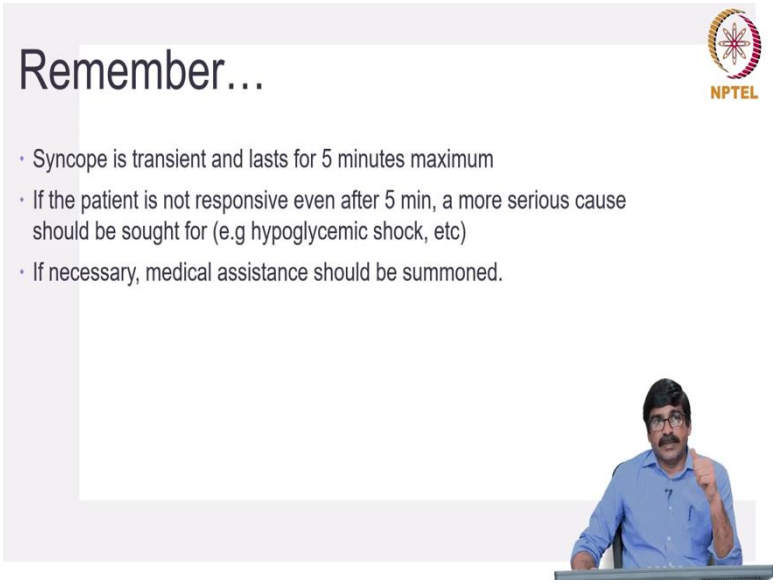
So, what does it do? If the patient has fainted and is losing, lost consciousness already, what you have to do is take a cotton pellet, dip it in aromatic ammonia aroma and then keep it close to the nose, ask the patient to take deep breaths. When the patient breathes this ammonia solution it has got a very, very pungent and strong odour. So, what it does is it irritates the respiratory mucosa in the upper respiratory tract.

So, this indirectly will stimulate the respiratory center. So, basically the spirit of aromatic ammonia solution is a respiratory stimulant. And it is very effective too so this will reverse or will initiate re-breathing so that the hypoxia can be reversed rapidly. If you are having a vapour roll, what do you have to do is you just have to crush it with the fingers and then keep it close to the nose of the patient and ask the patient to take a deep breath, this will reverse the problem.

Other things which are very commonly followed as sprinkling water on the face of the fainted patient. This everybody knows even a common public immediately after fainting, we tend to sprinkle water on the face. The exact scientific mechanism on which it is working or on which it is recovering the consciousness of the patient is not known. What is understood a little bit is when we sprinkle water on the face with force, the peripheral nerve endings are stimulated, this will cause twitching and contraction of the muscles of facial expression.

And in turn, this will cause compression or squeezing of the veins which will return more blood to the heart and the blood can be pumped to the brain by the heart. So, this the explained mechanism but it is still hypothetical we do not know but practically it works very well, most of the patients will become alert or regain consciousness when we sprinkle water on the face.

(Refer Slide Time: 30:55)



And lastly, what has to be remembered about syncope is, syncope is only transient phenomenon and most of the times it will last only 3 to 5 minutes. The moment you recognise the prodromal stage and you take appropriate measures the patients will be becoming alright and normal.

Even after frank syncope, established syncope if you carry out these measures like PABC, sprit as ammonia those things, the patients will regain consciousness immediately, it is a very, very transient mechanism, I mean complication. But sometimes the patient does not regain consciousness within a short span of time.

So, in these situations that is when the consciousness level is not regained even after 5 minutes then probably, we should think of some more serious process like hypoglycaemic shock or anaphylactic shock, so that we have to ack quickly to correct that particular problem which is more serious and which can bring in more complications. And if necessary, you can also summon for medical assistance, if the patient is not recovering consciousness within the stipulated time.