Ayurvedic Inheritance of India
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Module - 5
Surgical Conditions

Lecture - 15
Treatment of Fractures; Some Surgical Procedures

In this lecture we will be dealing with a very important chapter in Susrutas, great classic dealing with fractures which must have been very common in his time considering the great length at which he discusses this subject and from among the large number of surgical procedures which Susruta describes, I have taken an assortment for discussion.

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Now the contents of this lecture are the classification of fractures into twelve different types. He differentiated fractures from dislocations; there are number of illustrated examples, then the treatment of fractures how to deal with them, then the surgical procedures a listing of them.

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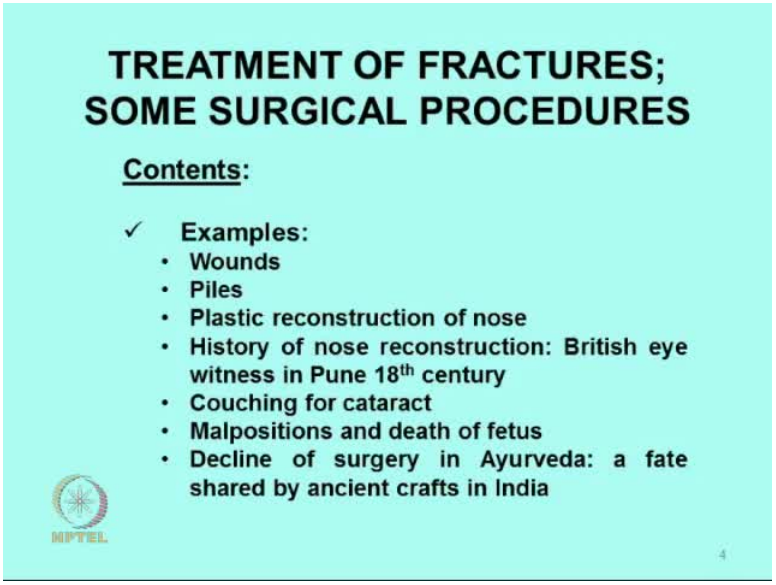

And a number of examples, they are common like wounds, piles, plastic reconstruction of the nose, number of these topics which are common or which are of interest from other angles, all those I have taken for brief mention or for detailed discussion. And I will conclude this by dealing with a very important subject that is the decline of surgery in Ayurveda. That is a matter of a great interest which we should look at with some special attention.

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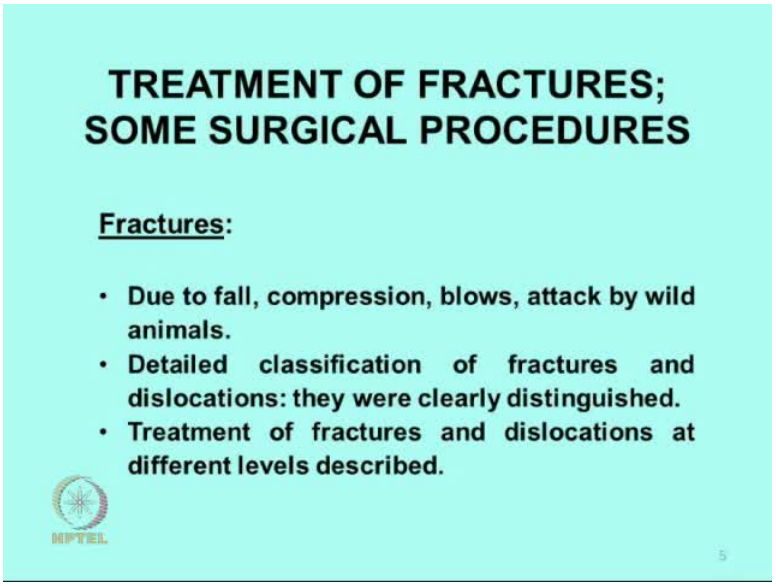

Now fractures the Susrutas time India was largely forested country and most of the transport was like bullock carts and so on. So, the commonest cause for fractures are falling of the trees or trees falling on people, attacks by wild animals or wars, these were not in frequent, small kingdoms, attacking armies, fighting. So, number of examples you will find of injuries, including fractures. These were all the common causes in those days. And there is a detailed classification of fractures which stands out in the Susruta Samhita and the treatment of fractures and dislocations, we will be dealing much less with dislocations; mostly I will be concentrating on fractures which are much more common.

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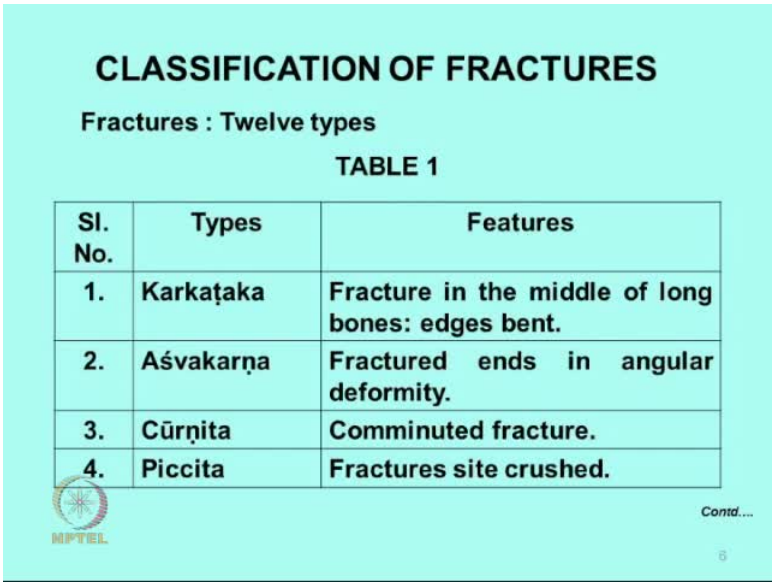

Now here the first is called Karkataka, here there is a long bone; there will be illustrations to follow. There is a fracture in the middle of the long shaft of a bone with the edges bent but not too much of deformity; that is a first type. Second is called Asvakarna where there is a fracture in the mid shaft, but there is gross angular deformity; that is another kind. Then there is comminuted fracture or Curnita where the bone is fragmented into several bits. Then Piccita there, there is a compression like a hammer blow, crush fracture; that is another kind.

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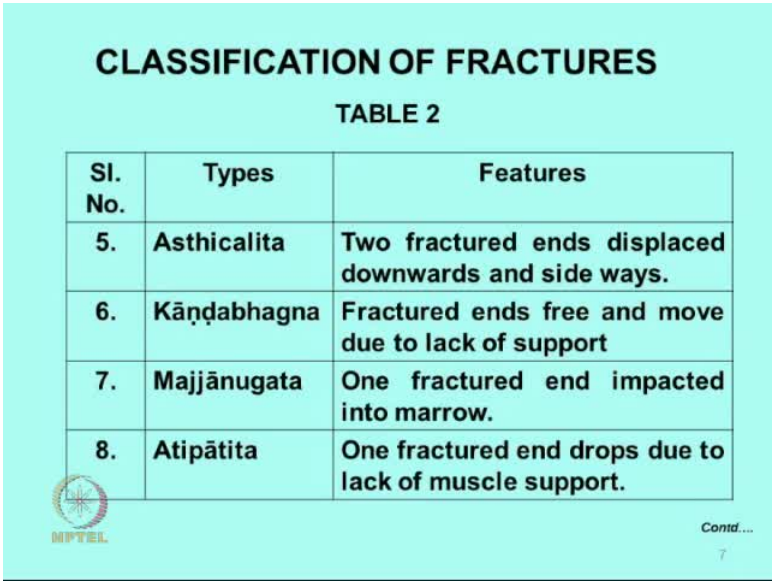

Then there is fifth kind called Asthicalita, there two fractured ends are displaced downwards and sideways. That depends on the kind of forces which produce the fracture and also pull of muscles which are attached to these two bone ends. Then there is Kandabhagna where the two fractured ends are almost free floating because there are not too many muscles attached to those two fractured ends. Then we have Majjanugata, there is a fracture, but one end to the fracture is pushed into or impacted into the bone marrow of the other fragment, impacted fracture. Then there is Atipatita; one fractured end is held up because there is a muscle attached, another one droops because there is no muscle attached to that.

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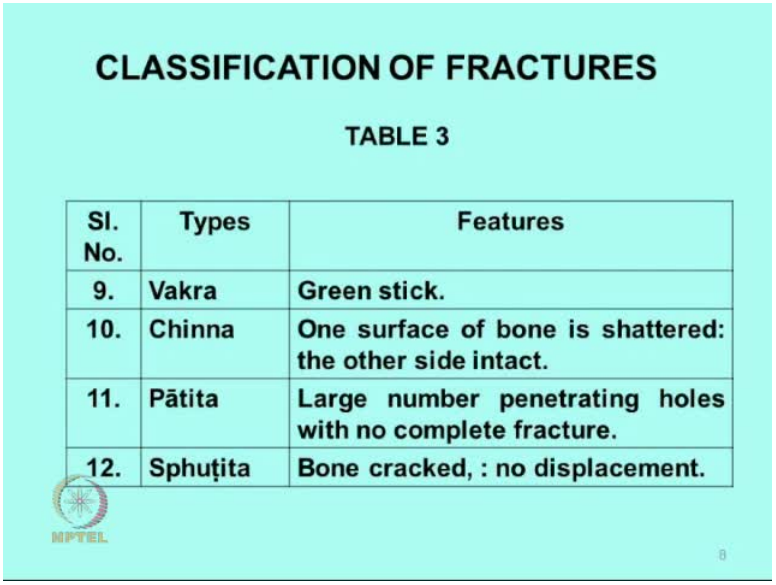

Then there is Vakra or greenstick fracture in children where the bone is not very rigid, it is flexible, it is a kind of curvature produced by Vakra. And the next two Chinna and Patita, these are unusual; they are not complete fractures, only one surface of the bone is damaged. It may be by shrapnel impacting there or most likely there were no shrapnel in those days possibly, so it could be an animal attacking and one side of bone is damaged by an animal bite may be, but the other half is intact. So, it is not a complete fracture, not very common, but those two are described by Susruta. And lastly there is a hairline crack in the bone; it is not a complete fracture, but it has to be treated like a fracture. These are the different varieties.

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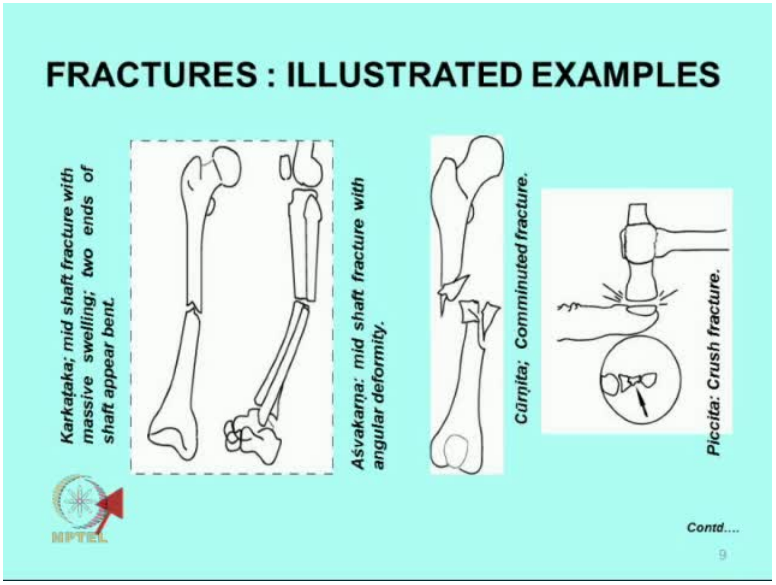

Now you see the pictures here. You can see the first figure on the left hand side that is a femur the thigh bone which is a long bone and that there is a fracture in the middle. The angulation is not very much, but there can be very big swelling of the thigh because there is a lot of bleeding because of this long bone fracture; that is one type. And the second, the next figure that you see; that is a mid shaft fracture in the middle of the leg below the knee and there it is a complete fracture of both bones and you can see the angular deformity is much more severe. Then we have the next picture, you see complete fragmentation of bone what is called comminuted fracture, a very severe type of injury. That is again shown in the femur as an example. And the last figure you see is a typical Piccita, that is a hammer blow accidentally and that crushes the bone and soft tissues.

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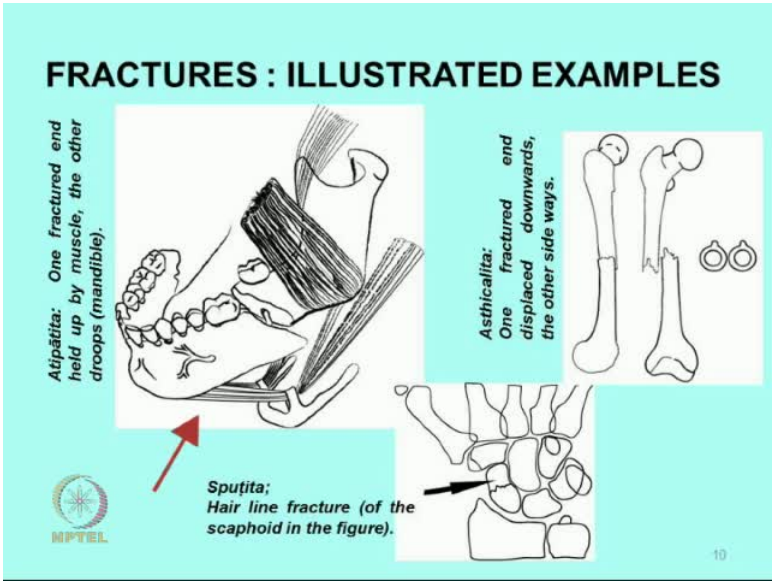

Then we come to this Athipatita, that is a jaw fracture and you can see the typical deformity because the rear part of the jaw is held up by a very powerful muscle called masseter and that masseter plays a very important role in chewing that pulls up the upper fragment, since there is no such strong muscular attachment in the lower fragment, it droops. So, it has typical deformity of the jaw. And then we come to Asthicalita, there is again a femur is shown as an example. There is a mid shaft fracture, but the displacement is very severe. So, you can see the two ends are side by side that cross section shown there. So, one side is lower; the other side is side with displacement, so that displacement is typically caused by the kind of injury, the way he fell down or a hammer blow, that really decides how these two ends are displaced.

Here they are side by side and all these are important because there were no X-rays in those days the deformity, the characteristics of the deformity, sometimes difficult to make out because of the enormous swelling. So, a good deal of clinical acumen was necessary to understand what kind of displacement might have taken place before you start the redaction. And the last picture lower down what you see the wrist number of small bones there are 7 or 8 bones there and one of them scaphoid, there is a hairline fracture there. Even with X-rays nowadays, it is not easy to make out this hair line fracture; it can even be missed, you may consider it is a sprain and send the patient away, but unlike a sprain even after a week or two weeks the pain does not go, the swelling continues. Now that could be a scaphoid fracture. Now these hairline fractures were

recognized not necessarily scaphoid, but there was a type of fracture which was incomplete, that was also recognized called Sputita in those days.

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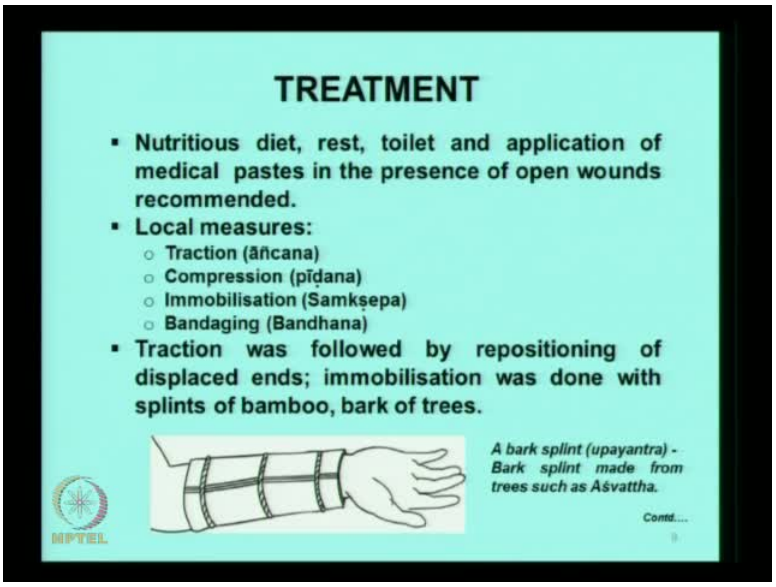

Now the treatment, there was a great deal of emphasis on the general treatment, the patients nutrition, he should be given adequate rest. If there is an open wound, suppose it is a compound fracture, the skin, the muscles, they are all damaged, they are open, there is a laceration and there is a fracture underneath. In that case the attention, the toilet of the wound is extremely important, foreign bodies must be removed, it should be cleaned. That has to be very thoroughly done; all those must be done and medical pacer applied and then only the bandage, etcetera will come. But the management of the fracture itself, there were four procedures which are surprisingly similar to what we do today.

The very first is traction, the two ends are and again the patient is given only wine and he is held because it is quite painful. There was no anesthetic at that time, so the method followed was to give plenty of wine to the patient and physical restraint. And the traction of that limb which is bone which is fractured, that usually brings the two ends more or less into alignment, but it does not stop there. There is always some manipulation and compression following the traction, so the both ends are coming together, then a certain amount of manipulation is necessary. Here familiarity with anatomy, imagining how the normal alignment should be, those are very important experience. So, that is how you

bring these two displaced ends more or less into alignment. That is the process of manipulation and compression.

Then we have immobilization, then there is immobilization in that position. That is where a splint becomes very useful and the splint may be a bark splint or a bamboo. These are all used to immobilize in that particular position, where the alignment is right and then bandaging is done. These are the four stages, traction, manipulation and compression, immobilization and bandaging. These four steps are more or less what we do today for reduction of fractures. You can see there is a figure at the bottom that is using a bark splint. These were barks of trees specially chosen, specially prepared cut to size and so on, these are used to immobilize the limb.

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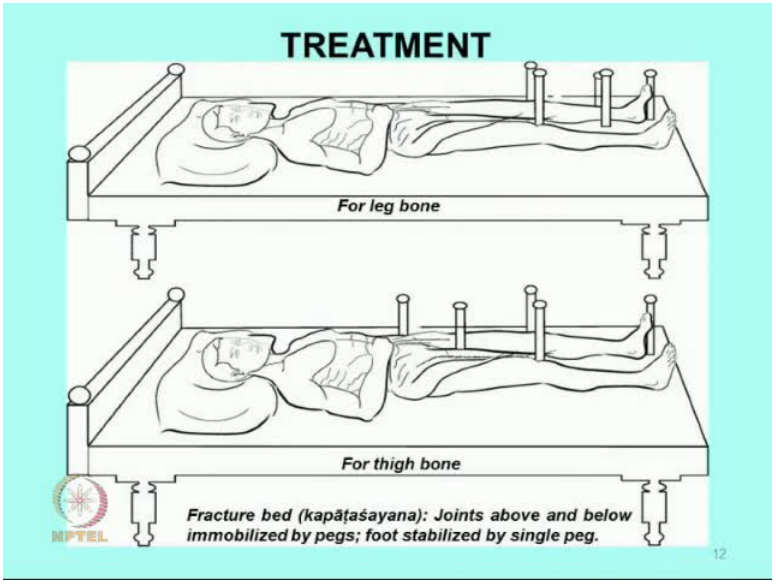

Now suppose there is a fracture of the long bones like the pictures you have seen. Sometimes it is necessary to immobilize it and if it is a fracture of the thigh, you cannot expect the patient to walk, there was no way it could be done, no nothing like a crutches are described .So, often it is necessary to have rest for the patient on a rigid bed, what is called kapatasayana in those days and this is a special fracture bed. And the principle of treatment in treating a long bone fracture, you should immobilize the joint above and below. Then only you can immobilize that bone preventing movements.

Now here is an example; if there is fracture of the middle of the leg, you will find the ankle and the knee are immobilized by having those pegs. And there is a peg, a solitary

peg at the foot so that the foot is kept in the right angles. So, that those pegs will make sure the foot is kept at right angle and the leg does not move the two tibia and fibula. When it comes to the thigh bone if you have to immobilize on this rigid bed, then you have the hip and the knee they are immobilized. So, that principle was recognized, the joints above and below must be immobilized.

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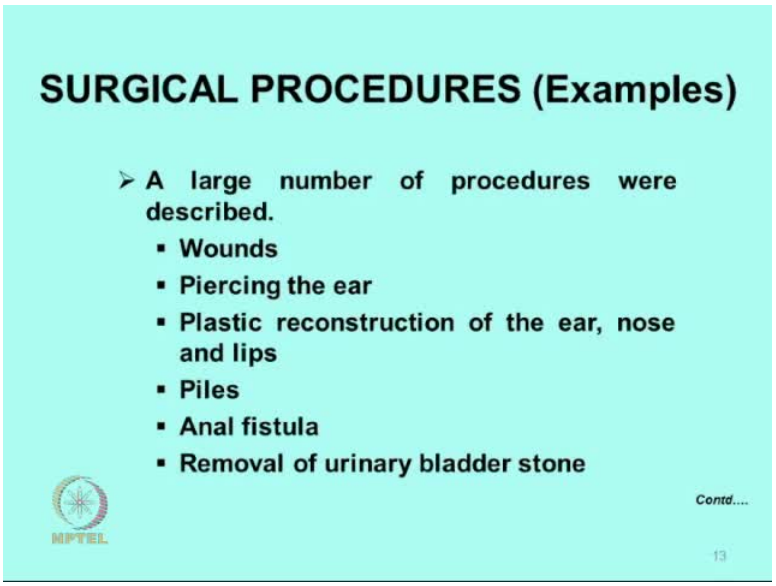

Then we have surgical procedures. I have listed a number of them; I will not be discussing all of them, but some of them I will be discussing. Wounds, extensive descriptions are there because these were probably the commonest condition the surgeons had to treat. Wounds by variety of causes, then piercing the ear; a great deal of discussion is held on piercing the ear for several reasons. One, it was the commonest procedure for puncturing almost as a ritual it was done for children, but some of these would get infected.

That is how it became a major cause for the surgeons worry because if the ear piercing is followed by infection, infection was called a dosha disorder at that time. If that happened, sometimes it would be that the ear lobe itself might become necrotic, it might drop of or it might become a very large ulcer, all this kind of problems and finally end up with a very ugly looking scar which is very prominent. So, those disfigurement or deficiency in the ear lobe itself, all these could be treated with plastic surgery. And

Susruta has some very interesting surgical procedures, how a flap could be taken from the cheek and this repair could be done

So, this ear repair and ear piercing these were subjects of great interest, but I will not be dealing with that in that much detail today, but that is an important surgical condition. And then plastic reconstruction of ear, nose and lips, I will be discussing nose because that is the best known operation originating in India. So, I will not be discussing the reconstruction of the ear or the lips. I will be concentrating on the nose reconstruction which we will do shortly. Then we have piles, I will be discussing that, anal fistula; again very commonly done procedure, but I will not be spending much time on those. Removal of urinary bladder stone, one of the most severe procedures described in Susruta Samhita, but I will not be spending time on that.

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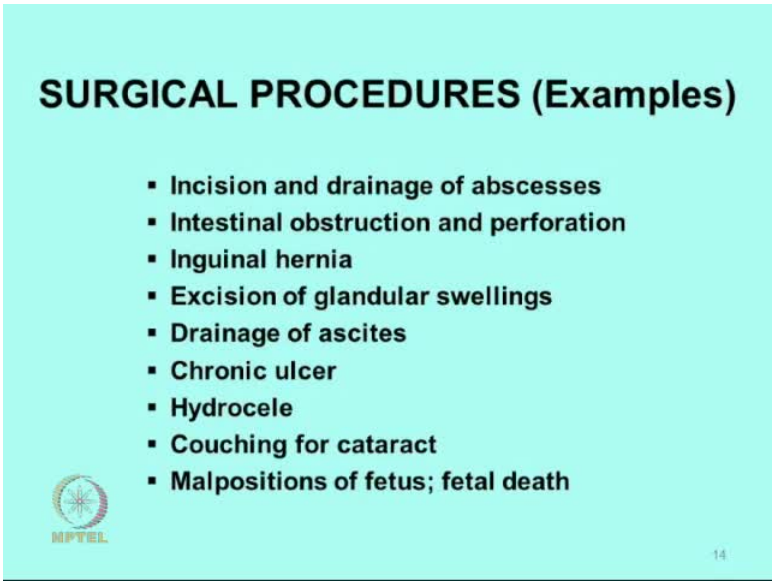

Incision and drainage of abscesses, another extensively discussed subject probably very common at that time. Intestinal obstruction and perforation, very dangerous operations often attended by poor results; I will not be discussing that. Inguinal hernia, excision of glandular swellings in different parts of the body, drainage of ascites or dropsy, chronic ulcers, hydrocele, couching for cataract; I will make a reference to that and malpositions of fetus. These are some of the conditions which received a lot of attention in Susruta Samhita, but obviously we will not have the time to discuss; all these I will be selective in dealing with these.

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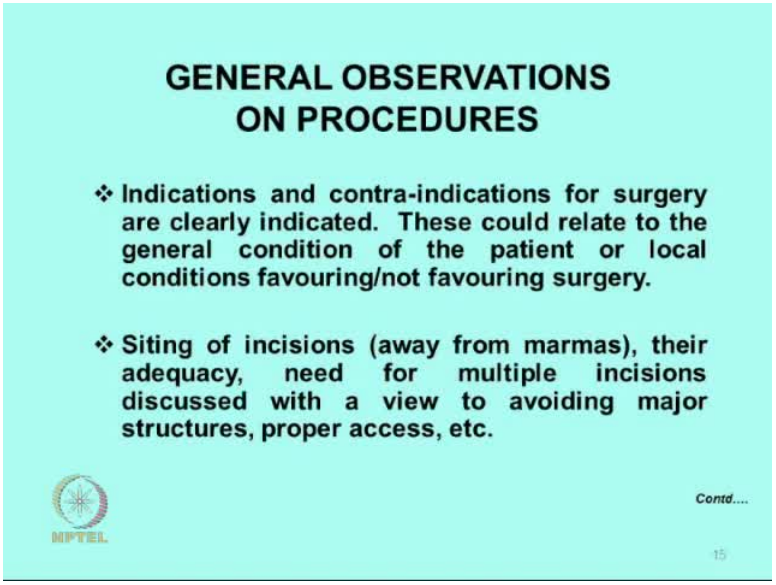

Now general observations, one is always these procedures there will be very detailed description on indications, when should you do it. Secondly, when you should not do it, both these are very important for a surgeon. Especially when you are beginning, there are certain conditions where it is better that you do not intervene because interventions will be attended at poor results or even danger to life. So, those are always listed separately. And the contraindication for example may not be a local one, suppose the man has got tuberculosis or he is wasted some other severe disease, jaundice whatever, so that may decide against going in for a surgical operation.

Then the second thing which attracted great deal of attention was sighting the incisions. This again we have covered earlier because it was important to have the right length of the incision. If it is too short, remember the patients is not under anesthetic, so you do not have too much of leeway, you have to be exact, even plan it earlier so that exact length of the operation. And sometimes you may have to have more than one incision, an abscess a very large abscess with one incision. You may not be able to drain it completely; you may have to have a second incision made, all that you should plan ahead, so that you cannot do any planning during the procedure when you are under great deal of pressure.

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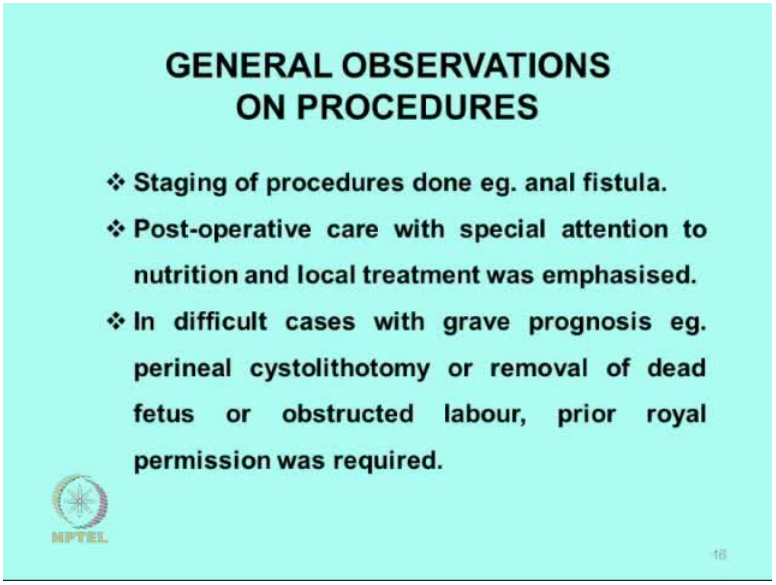

And similarly sometimes operations may have to staged, it cannot be done in one go. For example, especially fistula anal fistula, a complicated one, you may not be able to do complete in one procedure, but there again you should know in the first stage what is the operation I am going to do, what is the incision I am going to make. In the second phase what is the incision I am going to make, all these should be planned properly, stage the procedures, these are again described.

Then the post operative care, how to general care of the patient, general health is nutrition especially repeatedly stressed and local attention, how to keep it clean, how to apply the dressings and so on. And lastly the point which has been made earlier, if you are dealing with a very dangerous condition for example, intestinal perforation or obstructed labor, things of that kind, operations of that kind which carry a very great risk, patient may die, under those conditions you have to have prior permission taken from the kings officers.

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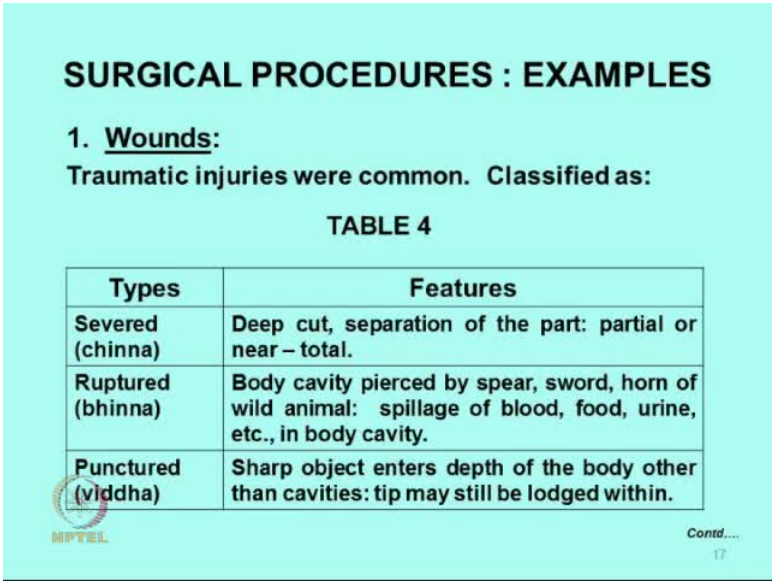

All these must be done, these are the general considerations. Then we come to the wounds which are very elaborately described in the Susruta Samhita. We go from the most sever to the mild, that is the way he has covered it. One is severed limbs; that is a deep cut and it may result for example, a deep cut in this area by a sword a cut has been made. And it may be partly separated the ear or a limb for example, or it may be completely severed, that is a deep cut; these are the severed, that is one kind of injury. And the next is ruptured; here there is a penetrating injury to the chest or to the abdomen with a spear or a sword or any kind of sharp instrument, an attack.

If that happens, often this kind of penetrating injury it damages the visceral may be the lung which is damaged, it may the heart, it may be the intestine or stomach or the liver, all these could be damaged by these ruptured bhinna that injury. Now that is a second kind and the features are also given, body cavities pierced, there is spillage of blood. If the urinary bladder has been stuck then there will be urine spillage into the abdomen. So, these are very dangerous conditions carrying very high risk. And the punctured; sharp objects enters, for example the buttocks or it may be the back, it does not enter any body cavity, but it does go deep into the tissue. Sometimes a part of it may be broken off; it may be retained inside, now that is the puncture that in type.

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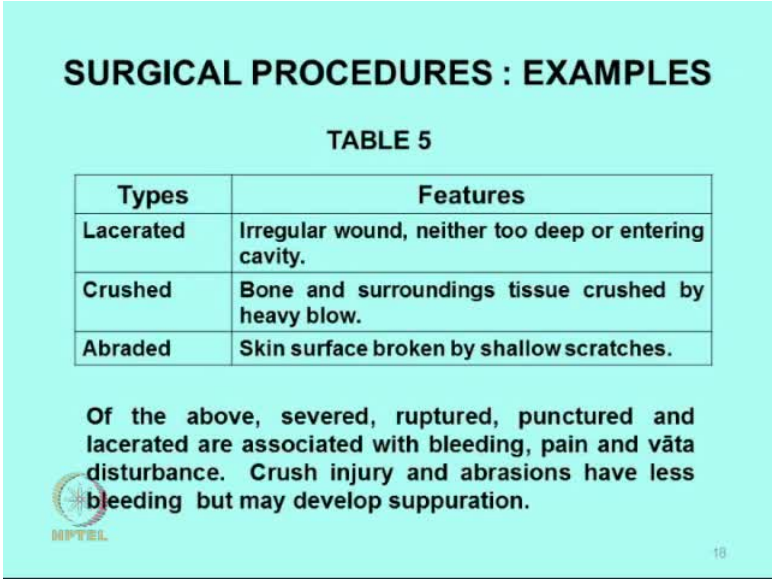

Then we have laceration, a deep irregular type of laceration. Suppose somebody fell, he falls over a sharp object and there is a sharp laceration, does not go into body cavity, but it is a deep laceration, deep cut. And the next is the crush injury; tree falling on somebody for example. It may be combined with damage to the bone or joints, lot of soft tissues are compressed, but there is no open laceration there; that is the crush injury. And lastly abrasions, these are small, superficial, a skin abrasions; those are the mildest. So, you can see from the severed, that is the most sever type of injury and the most mild that is the abrasion.

So, these are the different varieties of wounds which a surgeon comes across. Out of these the last two, the crush and the abraded, there is no open wounds, they do not bleed so much. Whereas all the others laceration or rupture, etcetera, they are attended by a great deal of bleeding. So, that these crush injuries it was noted in those days, one of the great problems they faced was suppuration, what we would call inflammation, that was the problem there, not bleeding.

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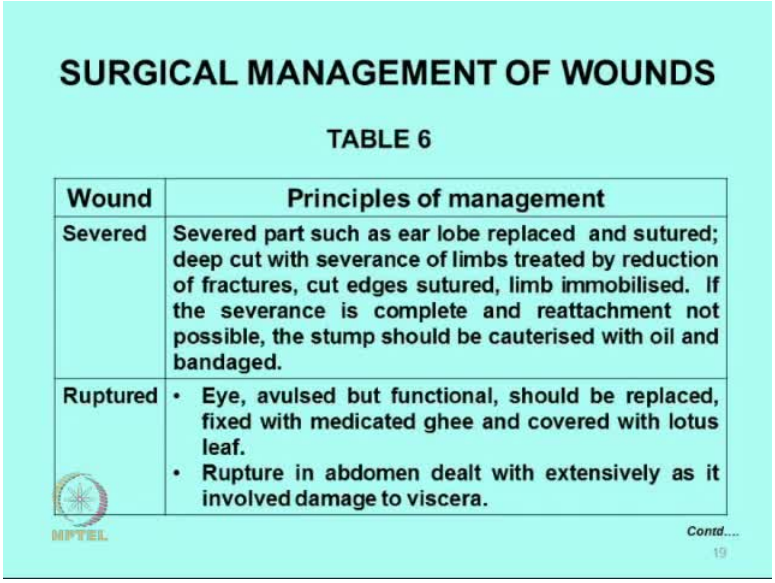

Now the principles of management; we cannot discuss the details of doing that, but severed wounds, suppose there is a deep cut involved in certain amount of rupture partial or complete. There the method followed was let us say the year lobe which was a common place where this severed injuries could occur, that was replaced and sutured after cleaning. And deep cut with severance of limbs is treated in the same manner, if there is a fracture that is reduced, then the suturing is done and immobilization is done, so that was the practice. But suppose the severance is complete and the reattachment is not possible, then there is you have to remove that and treat it like an amputation and the stump is treated with cautery and an appropriate dressing is given.

The principles are the same even today, every attempt will be made. Today of course, the reattachment has become very scientific, what is being done today could not be done even say 30 years ago. We have such fine techniques today to reattach blood vessels for example, or nerves. All these could not be done down 30 years ago. Certainly in Susruta's time that kind of precision was not possible, but the principle was the same. Every attempt was made to reattach the severed limb or severed ear whichever part of the body wherever possible that reattachment was attempted.

And if it was not possible, then of course you should cut it off and repair that wound. Then the ruptured, this I think it is a mistake to put it in the, it is also part of the severed and it is difficult to imagine orbit is not a body cavity, under what circumstances the eye

would be dislocated. What kind of injury, you do not see that often now, but avulsion of the eye this is repeatedly mentioned, there must have been some cause for that. Now if that happens again that should be replaced as long as the vision was there, the eye was intact; vision was there, but the eye ball is sticking out falling off.

Under what circumstances this injury occurred is mystifying, I cannot really follow, but the attempt is made to replace that and then it is cleaned with ghee and is covered with a lotus leaves; that was the wound dressing. And the rupture in the abdomen, it is discussed, but also the very great risk is pointed out because often it was attended. You have to open the abdomen, you have to repair the injury to the intestine or the stomach or urinary bladder and then you have to close the abdomen. And these were attended with very high risk. One little observation which is of interest, when you deal with intestinal perforations of these high risk operations, Susruta describes a very interesting way of repairing that hole in the intestine.

And even though we have seen in the description on in the instruments, the needles were known, suture materials were known. In spite of all that, when you discuss with the closure of the hole in the intestine, there is a very interesting technique he describes. A certain type of ants, black ants and these have horns they are attached to the intestinal perforation in the two edges. And once they bite very strongly, the two edges are brought together, then the hind part of the ant is cut off. A series of ants are used to bring these edges together and the rear apart, only the head with their horns, they are they are to hold it together. This was the method used by Susruta in repairing these intestinal perforations. It is not very clear why a needle and thread was not used, but I thought that is an interesting point in repairing these intestinal perforations.

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And we have punctured foreign body sticking in and the method followed was to remove that foreign body carefully. There is a channel and that channel was cleaned and then a probe, a medicated probe, a probe a cotton wig for example, soaked in a medicated ointments or whatever other medications the physician decides, it is soaked in that and that is used to plug this channel. And slowly everyday it will be taken out and if it is healing from the bottom, a shorter wick will be introduced.

So, over a period of days or weeks that channel would be healed completely, that was the method followed for the punctured wounds. And lacerations; cleaning, opposition of the edges and then the suturing is done to repair; that was the standard way apart from the attention to general, the rest of the patients, nutrition, diet, etcetera. All these are repeatedly mentioned in the management of these wounds. This was one of the commonest conditions which the surgeons had to deal with.

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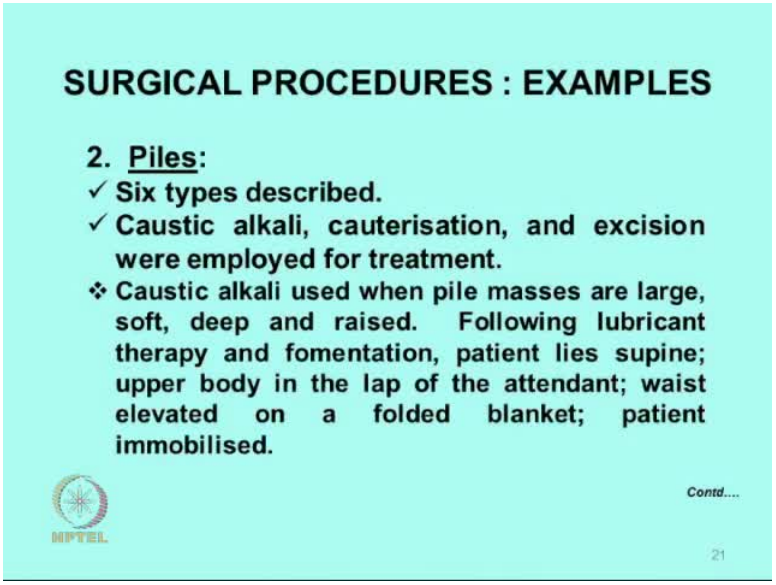

Then we come to piles, again a very common condition. There are six types described, the anatomy is fairly well described in piles. I would not get into all that, but here we are only dealing with the surgical procedures. There were three ways of treatment of piles; one is the use of caustics, the other is the use of cauterization and the third is surgery excision, these were the three methods. Now the caustics were used, we have already discussed how the caustics are prepared by the surgeon by the three different types; a strong type, a medium type and a mild type. Three types of caustics are prepared, they are available; they are in the form of a creamy type of a substance.

Now this is used in treating the piles which one to be chosen that is the decision of the surgeon. And initially the patient is given lubricant therapy or snehana followed by svedhana that is the fermentation body fermentation. These are given, administered in all these procedures, that is first given and then the instruments which you saw; one is the arsoyantra or a proctoscope that is introduced. Now in the use of these piles in the description you will find the surgeon has to do a certain amount of manipulation, some procedure, so that larger arsoyantra which we showed in the instruments, that is what is used with larger slit.

So, that is introduced after lubrication and the pile masses are visualized very clearly. And there in the first caustic alkali is used only if the pile masses are soft, that is the description. They are large, they are soft, and they are deep and rise, so the instrument

has to go a little deeper compared to the other one which is used for treating fistula which need not be so deep.

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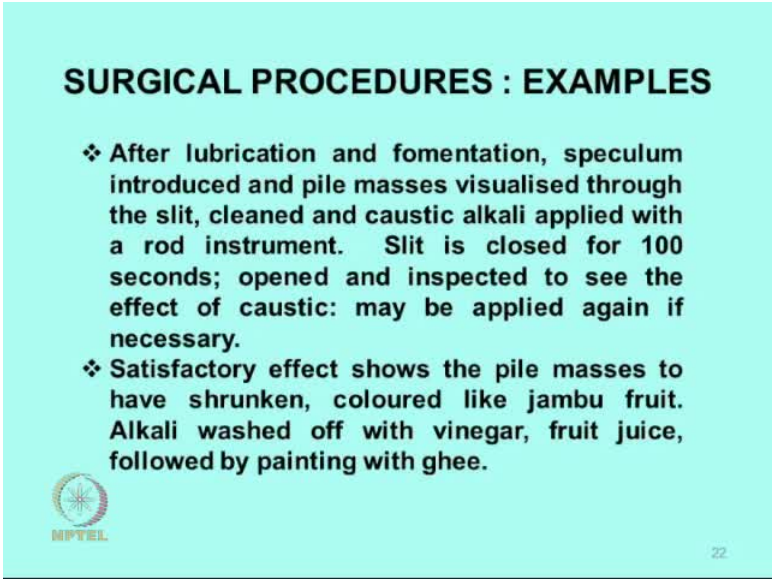

So, this particular arsoyantra is introduced and you can see the soft pile masses which are large may have fairly large base and that is the kind of mass which is suitable for applying the caustics. And the caustic is taken with a rod instrument, a Salaka type of instrument and that is smeared on this pile mass which is in full view. And after applying this, this is closed is turned and for a certain number of 30 matras; one matra is the time you take to pronounce a short syllable. That much time you wait and then you turn it and see that pile mass again, that is it has been exposed to this caustic for that much time. And then if it is properly done, you can see it may be the shape slightly shrunkened and also like a jambu fruit, it has certain amount of thrombosis is taking place, it is discolored and it has become a little shrunkened.

So, you know that this is adequate; if you are satisfied with a result of that application of caustic you can leave it alone, but if you are not satisfied you can apply that again and once again repeat this procedure. So, that is the caustic application, the first treatment of this type of piles. But suppose the pile mass is different and it is hard, may be a narrow base or a big base and high up that kind of a pile mass, then this caustic may not be satisfactory. So, there 100 seconds; I have made a mistake, 100 seconds is the time you give for the application of the caustic.

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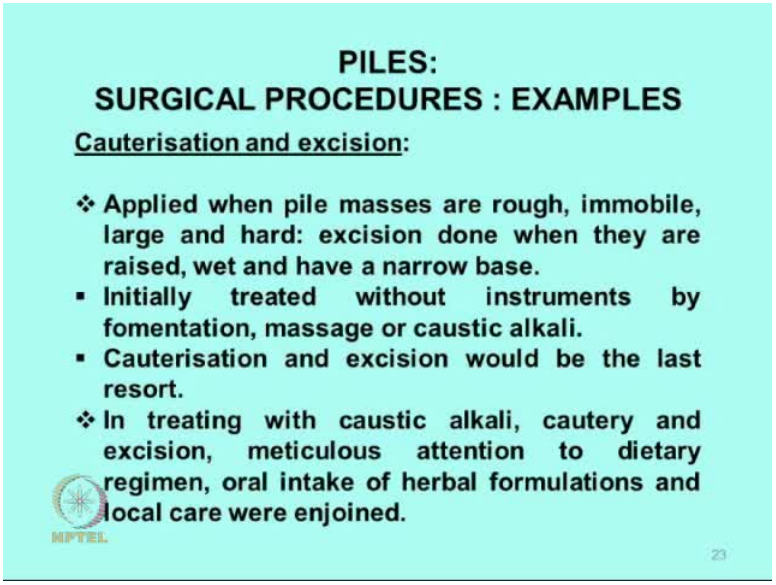

And if you apply the, pile mass looks not soft, it looks hard; it looks immobile and it is of fairly high up, if that kind caustic may not be satisfactory. There you may have to apply cauterization or you may have to do excision. So, if this mass which is hard unlike the soft one earlier and it is a fairly high up, and it has a narrow base then it is an ideal case for excision; that is what is followed or if base is not so narrow, narrow pedicle then you may have to apply cauterization.

So, it depends on the characteristics of that pile mass whether you are applying a caustic or whether you are doing cauterization; these are the two procedures. But ideally the effort always is to apply caustics, if you can treat with that, that is the best, but if it is a hard rough mass then it is not very suitable for caustics, you may have to do cauterization or excision. So, that is the gradation in which you consider these procedures. At the same time the general care, diet, oral intake, herbal formulations, all these are done in regardless of which particular technique that you are following.

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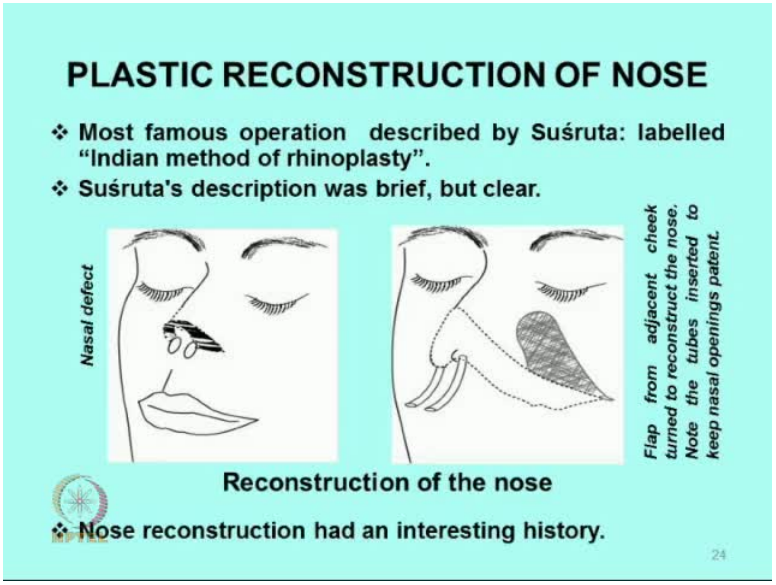

Now then we come to this operation of plastic reconstruction of the nose which is perhaps the most famous operation described by Susruta. It is in fact labeled as Indian method of rhinoplasty. That is perhaps the only operation which designed in India which has got international recognition. Now Susrutas description however is fairly brief considering the great fame of this operation, the whole thing is described in a matter of two or three verses that is all. That it is something which there is a message in that, we will talk about it little later. There is an interesting history about this operation, so I am going to spend a little time on this.

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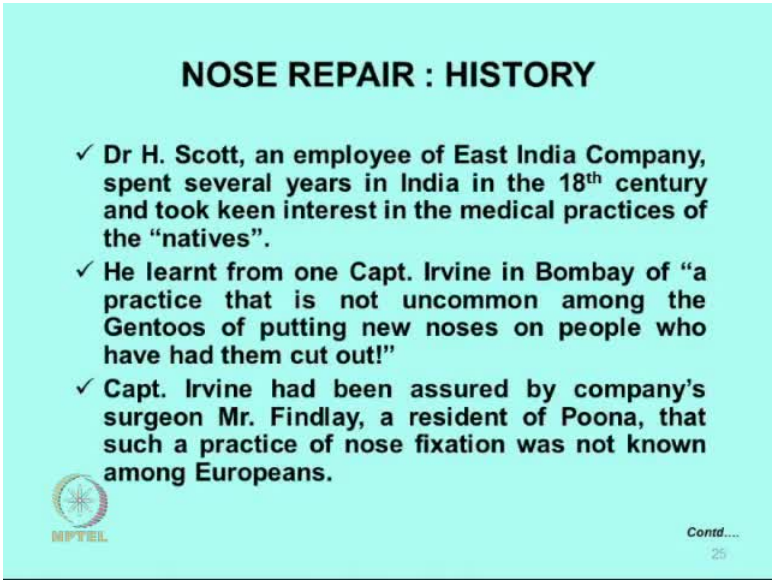

There was a surgeon, physician in those days; Doctor Scott he was an employee of the East India Company who was based in Bombay in the eighteenth century. Now he took a lot of interest in the India's various types of illnesses of the natives, the procedures that the native physicians did, he took a lot of interest unlike many others who never cared for what the natives were doing. And one day the captain Irvine, who has also stationed in Bombay, he told him about this practice that is not uncommon among the Gentoos. Gentoos are Hindus that was the way he pronounced of putting new noses on people who had had them cut out.

This is what this captain told Doctor Scott and this captain Irvine he had been assured by the company surgeon Mr. Findlay; Mr. Findlay you know in Britain surgeons are called mister, if you pass you MBBS you are doctor, but after you train as a surgeon and become a fellow in the royal college of surgeon, you are called mister. This is only in Britain you will see this. There is a history behind this because surgeons were barbers in the sixteenth century, fifteenth century; barbers were the surgeons, barber surgeons. So, that tradition they are called mister, they are not called doctor, only physicians were called doctors.

So, many years later surgery developed, as developed as medicine they are also doctors, but in Britain they are a very traditional people, they take pride in the fact I am mister so and so. So, a doctor becomes a mister, so that is how even now every year there is a dinner most worshipful company of barbers and the royal college of surgeons of England they have a dinner every year to celebrate this common ancestry. So, here Mr. Findlay was the surgeon, he was stationed in Pune and he had told his captain Irvine such a procedure is not known in Europe, that is putting a nose.

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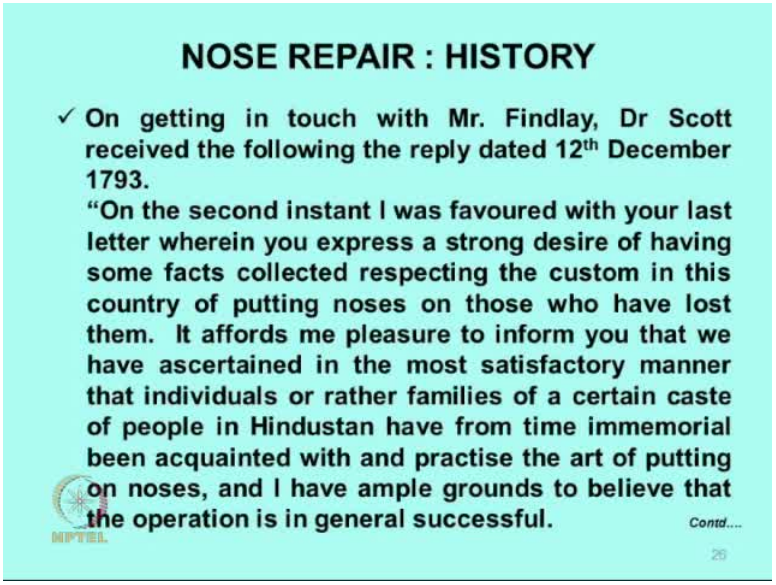

This is what, but Scott took interest in this; the Scott wrote to this Findlay in Pune asking about this procedure and this is a quotation, it is a long quotation, but I think it is worth reading of great historical importance. You can read it, but I will read it with you. "On the second instant I was favored with your last letter wherein you express a strong desire of having some facts collected respecting the custom in this country of putting noses on those who have lost them. It affords me pleasure to inform you that we have ascertained in the most satisfactory manner that individuals or rather families of a certain caste of peoples in Hindustan have from time immemorial been acquainted with and practice the art of putting on noses.

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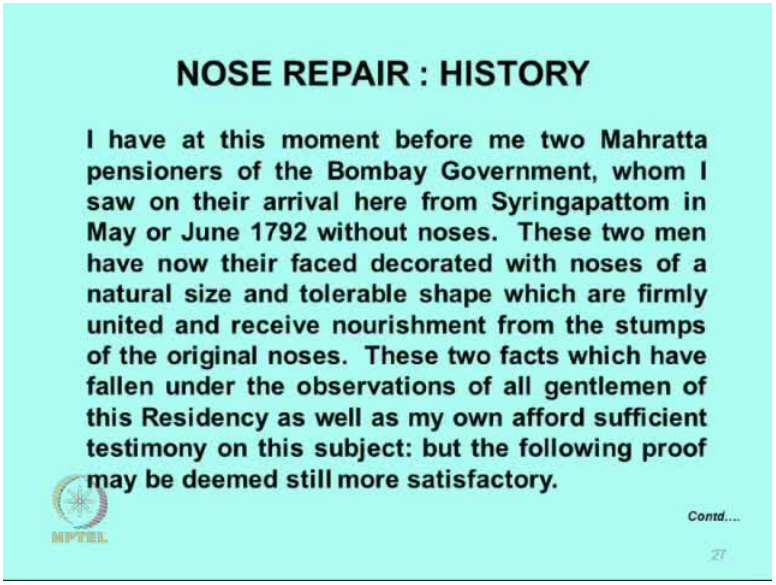

And I have had at this moment before me two Mahratta prisoners of the Syringapattom; Syringapattom is Tippu's where the British and Mysore army had crashed. May or June 1792 without noses, they had been cut off by Tippu's soldiers. These two men have now their face decorated with noses of a natural size and tolerable shape which are firmly united and received nourishment from the stumps of the original noses. These two facts which have fallen under the observation of all gentlemen of this residency; gentlemen means white people, as well as my own afford sufficient testimony on this subject, but the following proof may be deemed still more satisfactory.

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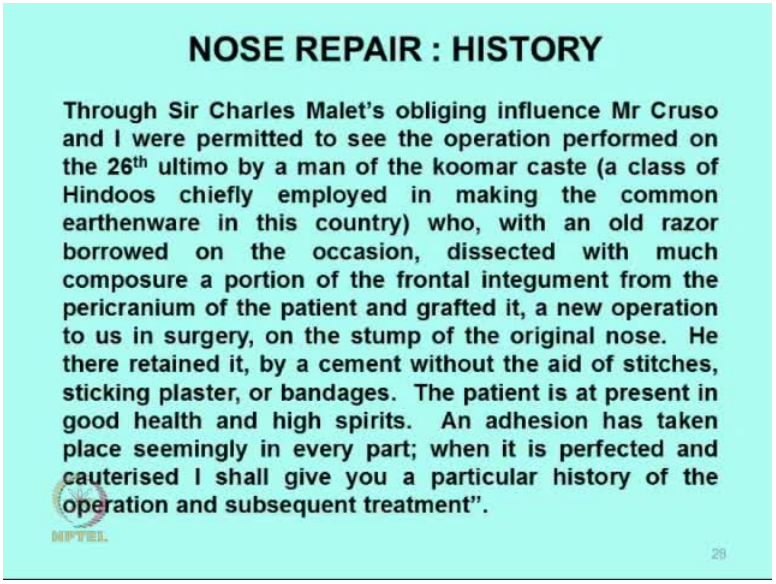

He was not after receiving the letter, this Mr. Findlay he took additional interest in this and he wanted to watch this operation. So, with the help of Sir Charles Malet at that time Pune it was Peshwas, British had not conquered; British had a resident or an ambassador, he was Sir Charles Malet. Through his influence Mr. Cruso, that was another surgeon, and this Findlay they got permission to watch this procedure being done. And that is what he describes; he saw operation being performed on the 26th ultimo by a man of the koomar caste, a class of Hindus chiefly employed and making the common earthenware of this country, these are the porters, who with an old razor borrowed on the occasion, dissected with much composure a portion of the frontal integument from pericranium, that is forehead and grafted it a new operation to us in surgery on the stump of the original nose. He there retained it, by cement without the aide stitches, sticking plaster or bandages. The patient is at present in good health and high spirits. An adhesion has taken place that is already it is healing seemingly in every part. When it is perfected and cauterized I will give you a particular history of the operation and subsequent treatment." This is a letter Mr. Findlay wrote to Doctor Scott; it is a very interesting, historically important document.

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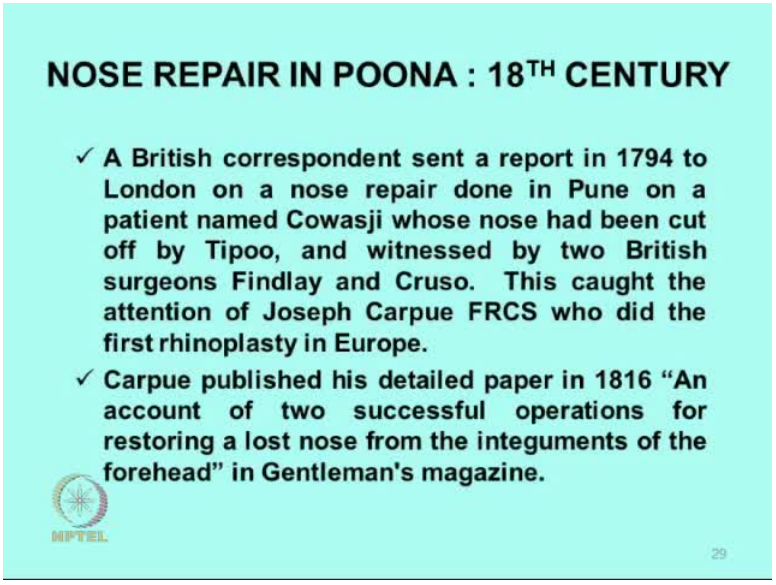

Now that was in 1793, but the next year a British correspondent sent a report on this operation to London. A nose repair done in Pune on a patient named Cowasji whose nose had been cut off by Tipoo, and witnessed by two British surgeons Findlay and Cruso. This caught the attention of Joseph Carpue, he was a surgeon it is the fellow of the Royal

College of Surgeons. He saw this report of operation and he did it for the first time in England, in Europe and Carpue published his detailed paper, he waited, he wanted to make sure that this healing is durable, so that what we call follow up he did that, and his paper came in 1816 called “An account of two successful operations for restoring a lost nose from the integuments, integuments is the forehead flap, of the forehead” in Gentleman’s magazine. And this Gentleman’s magazine was a very prestigious journal because you often find reference to this journal in Samuel Johnson’s life written by Bosswell which is a great classic.

In that Samuel Johnson’s life who lived in the eighteenth century, you will find repeated references to Gentleman’s magazine; many important articles appeared in this journal. So, that is where this Carpues paper was published and caught the attention of the whole medical community and surgical community in Europe and all over the world. That is how it is known as the Indian technique, but the description in the Susruta Samhita itself is exceedingly brief, only I think two or three verses compared to the treatment of, say, opening an abscess or dealing with laceration. All those very very detailed descriptions whereas when it comes to an important procedure like this, it is dismissed in two or three verses. It is difficult and lip for example, repair cleft lip, there is a description, only one verse, obviously it is done, but it does not get too much attention.

And the only way the explanation for this could be such an important procedure, you know Susruta Samhita which we have today was redacted by Nagarjuna, he was not a surgeon. By that time, that was in the fourth century, by that time already surgery had declined considerably. So, these procedures were no longer important, the Vaidyas were not doing these procedures. So, it was just listed, mentioned, not going into details because they were not doing it. It was being done by others, koomar caste people were doing; that could be one reason why such a very brief accounts, just two or three verses that is difficult to explain in any other way. Lip repair, equally important a deformed lip in a child, it is a lifelong trauma for the child and family, a very important to do but it is in one single verse. That happens because the importance of this had declined very considerably. I think that is something which we should remember.

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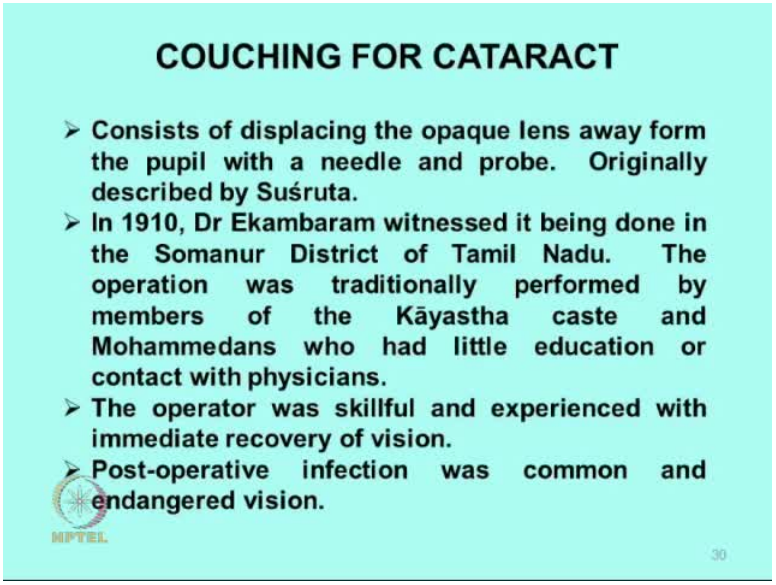

Then another example couching for cataract, now this is also described by Susruta and there what is couching for cataract? In those days they knew the lens had become opaque that was obstructing the vision. So, their method was to use a needle and a probe, these were the two simple instruments. So, if they knew that if they could displace the opaque lens out of the way of pupil then you could restore vision, this was understood. So, the method followed was with a needle you make a puncture in the right place and you introduce this probe and you dislocate the lens from its position away from the pupils, so that the vision is restored.

This was couching for cataract which was described in Susruta Samhita, but nobody had actually seen it done just like the repair of the nose. If the British observers have not seen it and described in such detail, I am pretty sure that none of us would be aware of this; the world would be would not be aware of it. But, here again it is a same story, in 1910 one Doctor Ekambaram he witnessed it being done in Somanur District of Tamil Nadu, I do not know where Somanur district is, but there was a district at that time there he saw this operation. And he had given a very detailed description of what he saw and the operation was traditionally performed by members of the Kayastha caste or by Mohammedans who had little education and who had no contact with physicians. No physicians thought them, it was always taught by the father to the son that is how it process.

They had no understanding of the anatomy of the eye or Vata, Pitta, Kapha, none of these, but if there was cataract blindness they knew this procedure; how to do that, they had a great deal of practical skill because repeatedly doing this. So, in fact that description which Ekambaram witnessed as soon as this was done he could see, he was so surprised, the patient everybody else they are all applauding that this great achievement. But unfortunately the post operative infections rate was very high and most of them lost their vision because of infection which is understandable, because there was no understanding of asepses at that time.

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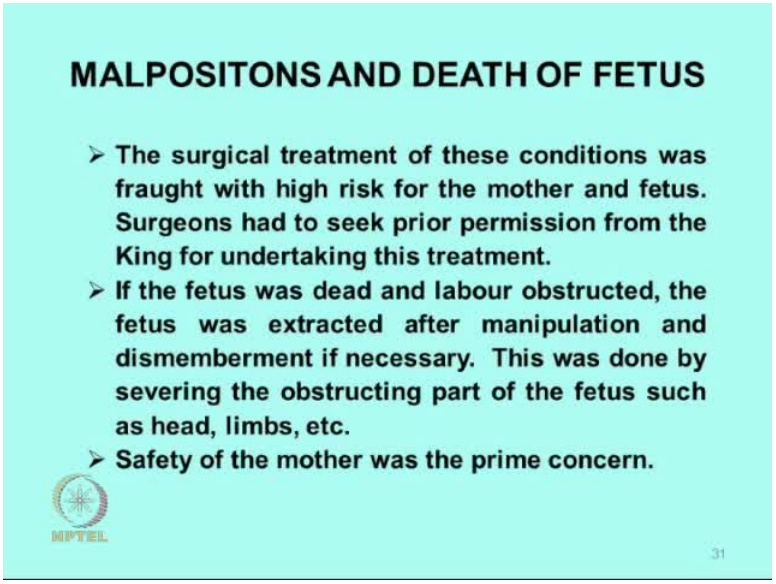

So, this again is a procedure which was popular at that time; it went out of the main stream of Ayurveda completely. Then we have malpositions and death of the fetus, these are very sever conditions. The obstructed labor, the head of the fetus or the shoulder, transverse lie of the fetus, all these are extremely dangerous, labor cannot progress, the women's life is in danger, under those conditions surgeons would be called and if the first priority is the mother, so the baby is nearly dead with this kind of transverse lie and so on.

They had to do the drastic operation that is you have to divide that obstructing part if whether it is the shoulder, whether it is the head. So, some of those instruments which we have seen would be used for these. Sometimes you have to crush the head, all these very severe procedure, so that the obstructing part is removed and the fetus can be taken out,

so that mother's life is saved. That was the priority, but before doing this the surgeon had to get royal permission as we have repeatedly mentioned.

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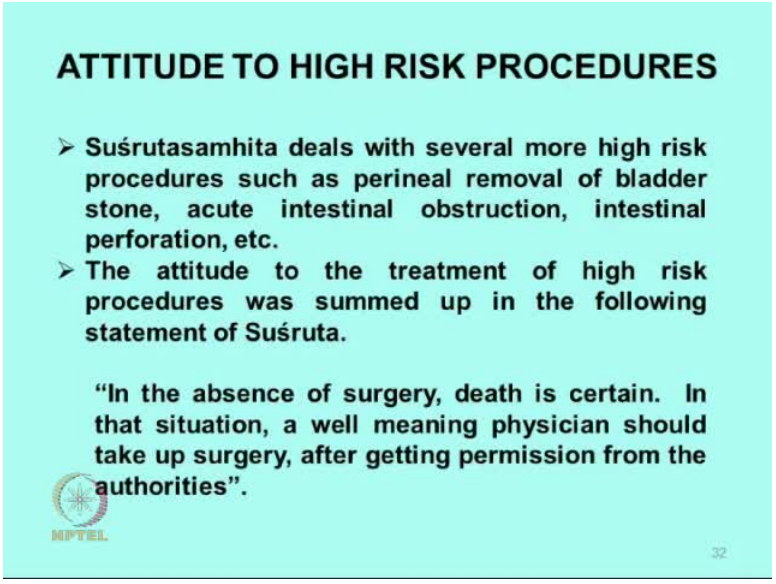

Now attitude to high risk procedures is very important. Susruta Samhita deals with this. How do you when you see something like this acute intestinal obstruction, intestinal perforation carrying very high mortality. He says the attitude to the treatment was summed up in the following statement. "In the absence of surgery, death is certain. In that situation, a well meaning physician should take up surgery; that is important he was a radical in that sense, after getting permission from the authorities." It is not just to leave him alone, do not do anything; the thing is take the risk and knowingly you take the risk, informing the relatives, taking royal permission you should do it. That is the duty of the surgeon.

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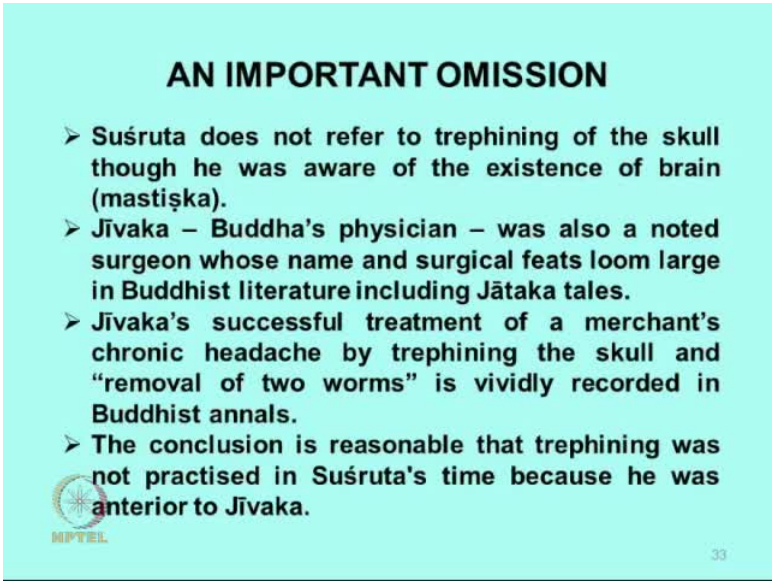

Even today that attitude is the right attitude. There is an important omission in this long list of operations Susruta gives, there is no mention of the trephining of the skull. Head was known, there was a brain inside, mastiska was known, importance of the head, all these are described, but here is no mention of trephining of the skull in the entire Susruta Samhita. But when it comes to Jivaka, Buddha's physician, this is acclaimed, this operation of trephining of the skull. When he came back to Pataliputra after his training in Taksasila, he was so skillful; he became the physician to Buddha. He was physician to Bimbisara the king, he operated on the fistula, anal fistula of Bimbisara, all these are described. So, a rich merchant in Pataliputra developed severe headache incurable and the physicians gave him only 7 days to live, he was that kind of severe illness.

And Susruta was consulted, the 7 days only given and he said it is curable by an operation, but they had to get the permission of king Bimbisara, he was the royal physician to treat a rich man a commoner. So, that permission was obtained and there he talks about this trephining being done and two worms being removed and the merchant was cure of this. So, this is celebrated Buddhist literature; this is not mentioned at all in Susruta Samhita, so I mention this. So therefore, it is of some historical importance that tells us that in Susrutas time this operation did not exist; it came later on that gives some important clues about the time of Susruta.

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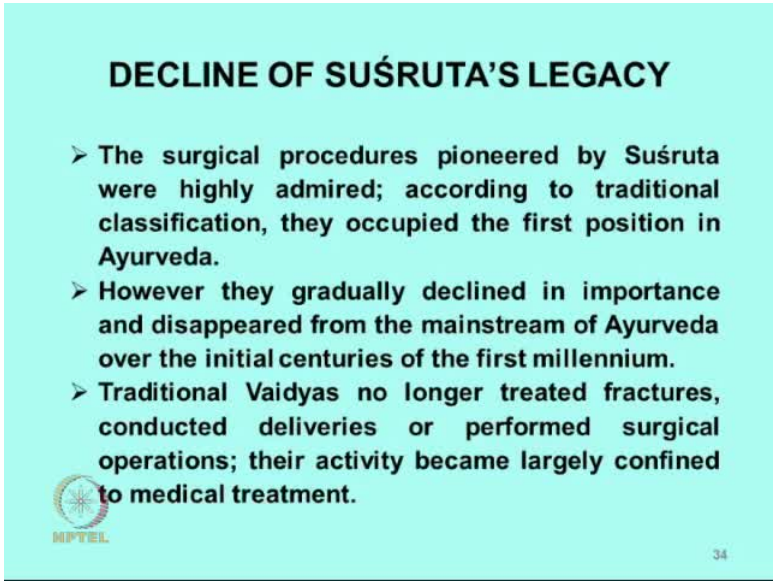

Now the decline of Susrutas legacy, that is the subject of great importance because all these procedures pioneered by Susruta were highly admired. Surgeons were respected, Shalya was given the first place in all the braches of Ayurveda, all these are true in his time, but it started declining in importance and disappeared from the mainstream of Ayurveda for the initial centuries of the present era like the third, fourth centuries by the time this Susruta Samhita was redacted, already the importance had considerably declined. That is how a major operation like this is dismissed in two or three verses. Now this traditional Vaidyas, they no longer treated these like fractures, deliveries, surgical operations, all these are described in Susruta. The traditional Ayurvedic physicians were no longer looking after these in the early centuries, fourth, fifth centuries certainly by the time of Vagbhata that was true. They were all confined to; Vaidyas confined themselves to medical treatment.

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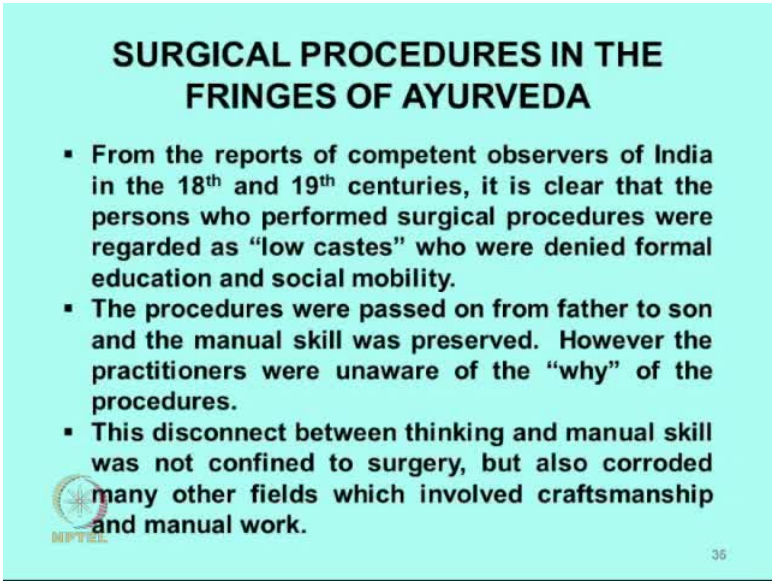

Now from the reports of these observers, especially British observers, eighteenth and nineteenth centuries, it is very clear that all these procedures done whether it is couching for cataract or doing various types of plastic reconstructions, they were all done by people who were classified as lower caste. This is all over India that had happened and they had no formal education, they were denied an opportunity for education and they had no social mobility. They were born into this caste and they have to keep on doing this and then teach it to their son and, that is how it goes.

And because of this no formal education, they had no understanding of anatomy, no understanding of Ayurveda, only this manual procedure they knew. So therefore, they could not answer the question, why? Why is it you are doing? How they know, how to do this? How to cut this? All that they know, but if you ask them why are you doing it like this? That they could not answer because they had no education, this was one of the greatest problems in India.

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And this disconnection between thinking and manual skill, this was not confined to surgery alone. We have already seen something about all areas of craftsmanship; you have seen an example already about steel makers of India, another greatly admired achievement of India making good steel. We have seen that James Franklin's example, going to Jabalpur, asking this man who built this furnace, who built a refinery and how do they do this; collecting the ore, processing it in a certain manner, making steel of high quality. Now if you ask them why are you doing it like this? Franklin kept asking. He could not answer any of those; he would always say this is what my father has taught me. And the steel itself was comparable to the best Swedish steel that was the quality of the work.

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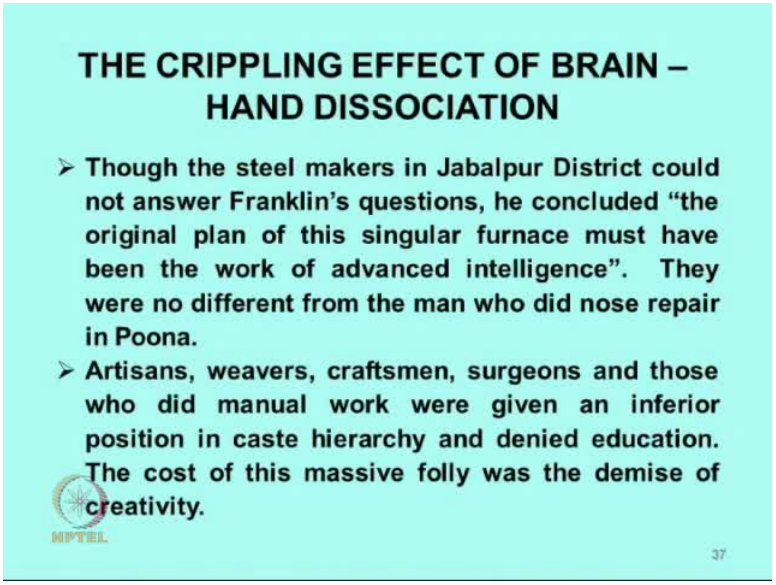

And in fact the Franklin he says, since none of his questions could be answered, he adds the original plan of the singular furnace must have been the work of advanced intelligence. Only somebody with advanced intelligence could design this, that is what he says, but the man actually doing it could not answer any of these questions. Now artisans, weavers, craftsmen, surgeons and those who did manual work were given an inferior position in the caste hierarchy and denied education. The cost of this massive folly was the demise of creativity; we were no longer able to create it; that was lost.

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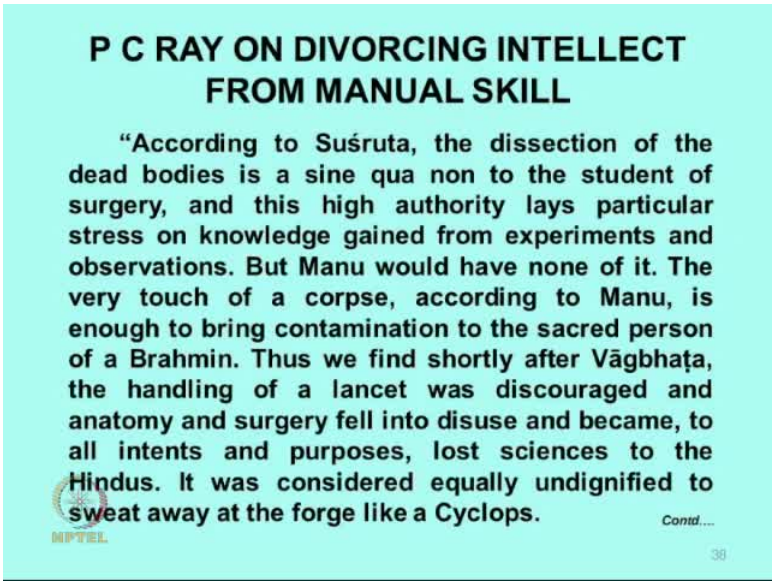

And about this P. C. Ray, one of the great scientific pioneers of India, when the British came initially, what is called Indian renaissance in Bengal in Calcutta. P. C. Ray was one of the first products of this, the founder of modern chemistry in India. And P. C. Ray in his great book on history of Indian chemistry this is what he has to say, an extended quotation.

"According to Susruta, the dissection of the dead bodies is a sine qua non to the student of surgery, and this high authority lays particular stress on knowledge gained from experiments and observations. But Manu would have none of it. The very touch of a corpse, according to Manu, is enough to bring contamination to the sacred person of a Brahmin. Thus we find shortly after Vagbhata, the handling of a lancet was discouraged and anatomy on surgery fell into disuse and became, to all intents and purposes, lost sciences to the Hindus. It was considered equally undignified to sweat away at the forge like a Cyclops working with metals.

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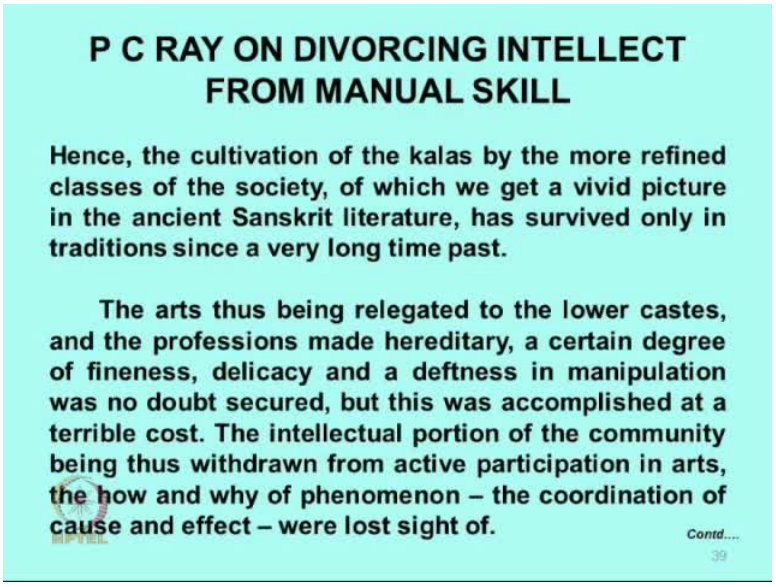

He goes on, hence the cultivation of the kalas by the more refined classes of the society because kalas there are 64 kalas according to Indian tradition, of which we get a vivid picture in the ancient Sanskrit literature, has survived only in traditions since a very long time past. The arts thus being relegated to the lower castes, and the professions made hereditary, a certain degrees of fineness, delicacy and deftness in manipulation was no doubt achieved, but this was accomplished at a terrible cost. The intellectual portion of

the community being thus withdrawn from the active participation in arts, the how and why of phenomenon, the coordination of cause and effect, they were lost sight of. That was the price that India paid for this.

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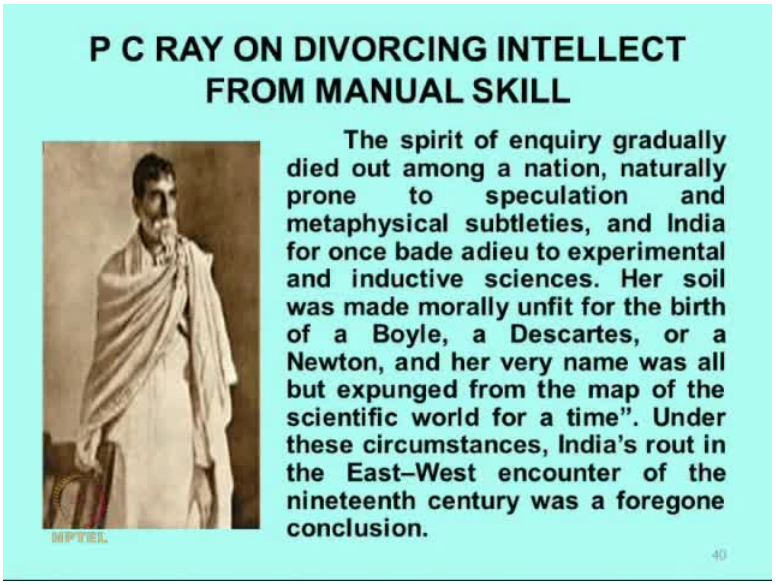

This is P. C. Ray's picture and he concludes by saying, the spirit enquiry gradually died out among the nation, naturally prone to speculation and metaphysical subtleties, and India for once bade adieu to experimental and inductive sciences. It is a very sever indictment. Her soil was made morally unfit for the birth of a Boyle, a Descartes, or a Newton, and her very name was all but expunged from the map of the scientific world for a time."

Now these are the very profound observations of P. C. Ray and under these circumstances India's rout in the East-West encounter was a foregone conclusion in the nineteenth century. That is what we learnt from this history of surgery in India. It is a lesson that we should learn that is dissociating head from the hand because only that coordination; otherwise, repetitive skills you become skilful, dexterous, but you can never be creative. And that is something which we should remember that is the take home message from this story of Indian surgery.