

**Psychiatry an Overview**  
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**Module-04**

**Psychiatric Disorders and their treatment-2**

**Lecture-19**

**Sleep Disorders-1**

Welcome to the last two lectures of this course and it is about a topic which concerns all of us whether you are having some problem or you are not having a problem. And perhaps all of us need it and yet they did lot of myth around it and lot of questions around it. This is one of the most common presenting complaints not only psychiatry clinics, but also neurology and lot of these other clinics and that is sleep.

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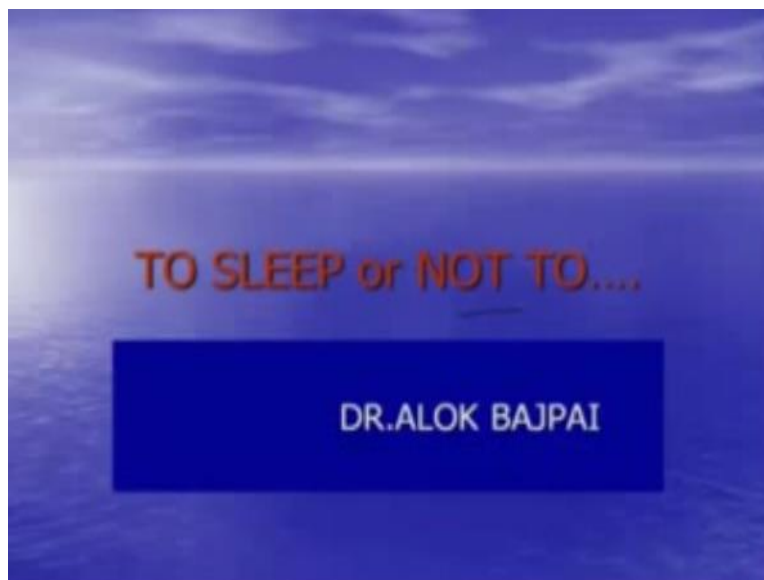


So I have tried to label it as to sleep or not to. The young generation obviously sleeps less and that is a constant source of trouble and fight with their parents. But they also cannot, however

late they want to keep awake and for how many days they want to keep awake. Eventually sleep catches up like hunger catches up.

So sleep is one of the basic functions like hunger, thirst, sex all controlled by Olympic system and hypothalamus to sleep or not to sleep.

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If you ask people when they have something to do they will think okay, why sleep let more, some students come and tell me that, they do not want to sleep, they want to study or do other things. Even those who d not want to study want to play on their Facebook or chat or do with all this envision of cyber technology.

Obviously the sleep patterns are altering, but sleep is something which has been there from ages. So the first question is why sleep.

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Let us understand about sleep before talking about the problems with sleep or disorders. Why sleep, sleep has our restorative function, if you get tired.

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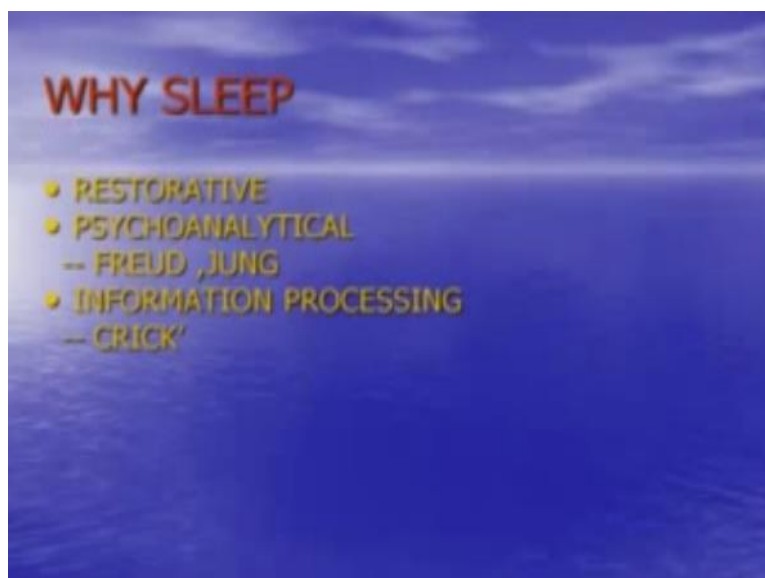
And your body wants to rest and gather up energy so one way of doing it is go to sleep the energy expenditure will be less, it will be doing less thing. And when you get up your energy and your mind and everything is restored. If you look at there have been, these are the theories.

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One is the restorative theory, one is a psychoanalytical explanation which Freud, sequent Freud and Carl young they build up a whole theory based on the unconscious and conscious and how the sleep really creates dreams and how the sleep really, this phases of sleep actually take up whatever is from you're unconscious and express it in the form of dreams.

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Information processing, Francis Crick the guy who discovered DNA with Watson, but out of this process of information processing where he said that whatever goes into your mind during the day time and awake hours is actually integrated in the dream sleep, into your existing memory where you was learning. Some of it is eliminated; some of it is like integration is the existing memory. And there are something called what you call AM theory.

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Activation integration theory, given by Hobson. Now these are all theories giving a model of why people need sleep. Activation synthesis also is almost like however Hobson may not agree, but almost nearer to what Freud said that, whatever goes into your head the brain gets activated during dream sleep.

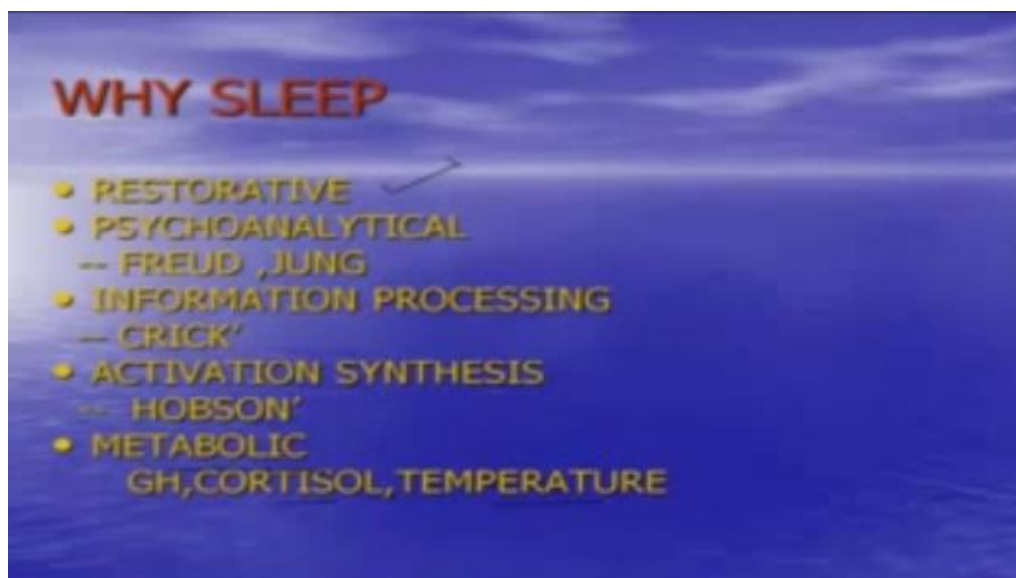
And it is the unnecessary part is eliminated, the whole brain is activated and he also causes almost like a psychotic state where hallucinations are replaced by dreams. But these are as far as the theory about dream sleep is concerned, the deep sleep obviously it has a restorative function.

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As mentioned, but there is a lot of metabolic stuff which goes on into the sleep, like when children are growing the growth hormone which is very important for the growth of a child is secreted mainly in the deep sleep which is a non dream sleep. I will tell you about this stages when I –

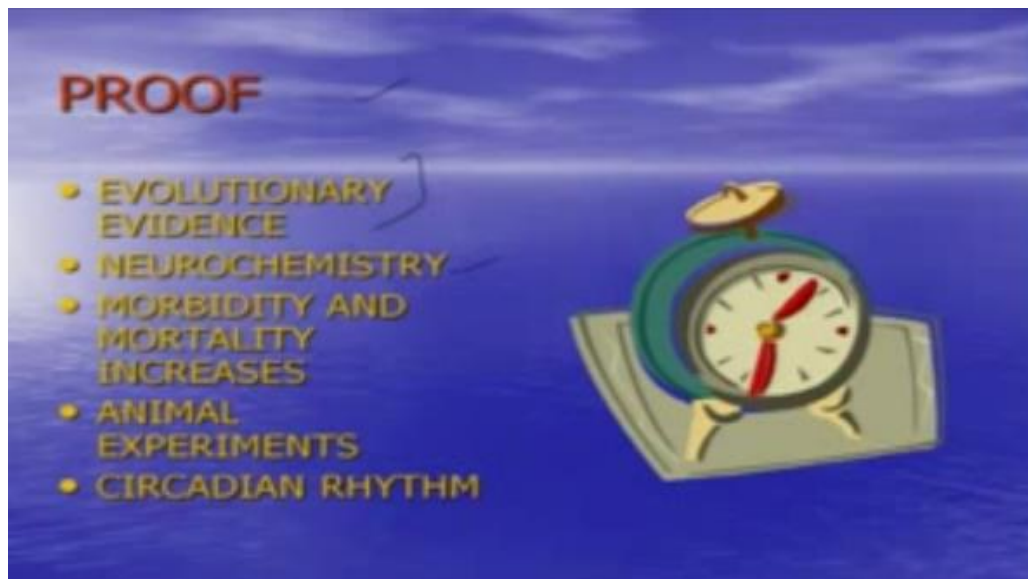
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Cortisol, temperature and these are normal things to survive. So the cycle of cortisol which is a stress hormone it is secreted more when you have stress the temperature regulation that temperature is maximum when you're going to sleep and as you get towards the morning, the temperature of the body settles down.

This may have some restorative function, so body has its own rhythm and what is the proof of all this theories.

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The proof is one is evolutionary evidence, neurochemistry and the mobility and mortality which increases, animal experiments, circadian rhythm. But these are all proof that sleep is necessary, what is the evolutionary evidence all animals sleep, and to the extent that like Dolphin, when Dolphin is sleeping one half of the brain sleeps and the other is active and it keeps reversing.

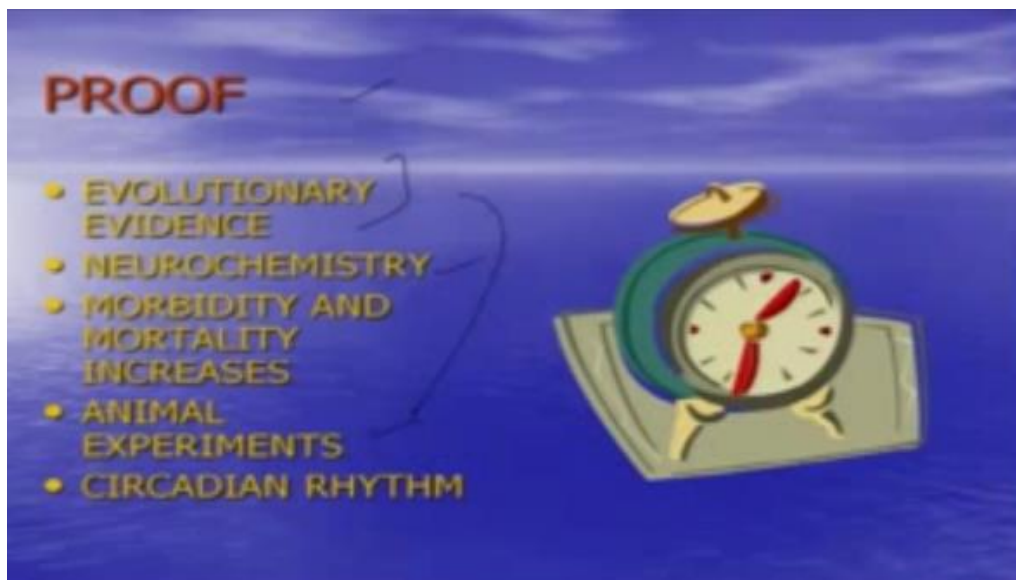
All animals neurochemistry, if you find definite changes in the – if you remember the neurotransmitters the neurochemistry tells us there is a certain change in serotonin and



acetylcholine level depending on what phase of sleep one is in. I will explain it as we move on. 4-10 hours is considered to be more or less the normal range.

People who sleep for very long less than four hours or more than 10 hours have more bodily, physical illnesses or mental illnesses associated with it.

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Animal experiments as I said we know that all animals sleep. Circadian Rhythm, circadian is a rhythm which is within 24 hours, it is obviously related to sunlight. So over evolution, or when millions of years the mind has been trained to sleep and keep awake, this is one of the normal, natural oscillations which exist.

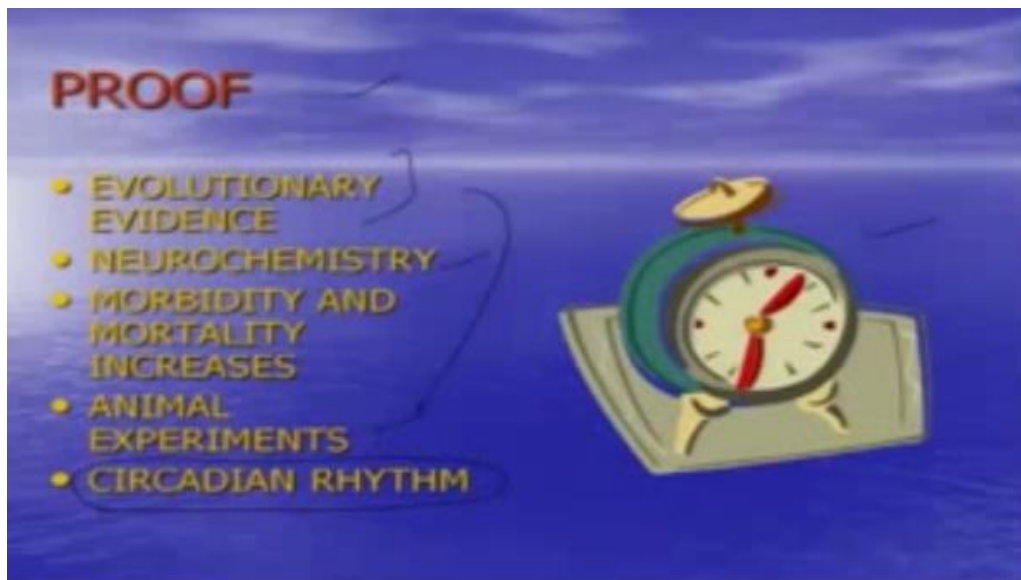
And these are endogenous rhythm which can be proven, because they have been experiments where we have seen that a person was isolated from all other external indicators of change within a psychiatry these are called Z grabbers like sunlight, like the artificial things like traffic, peak traffic the fluctuation of light in the peak hours and this person was isolated and kept in a uniform light away from the vibration coming out of traffic, the peak fluctuations of the light which happens everywhere not only in India and everywhere.



And then the person was left in the free running cycle and it was found that there is a endogenous rhythm, the rhythm which comes from within in absence of all this external it gabbers and that cycle runs up to 25 hours, 25 plus minus here and there. So there is a natural rhythm which our – which over years as we developed this artificial contraption of time called clock.

We have tried to fit it into 24 hours, so we normally 12 to 12 that is artificial contraption there is nothing in the nature which tells you that the whole thing runs around 12 to 12. We have made this clock in conjunction with the sunlight.

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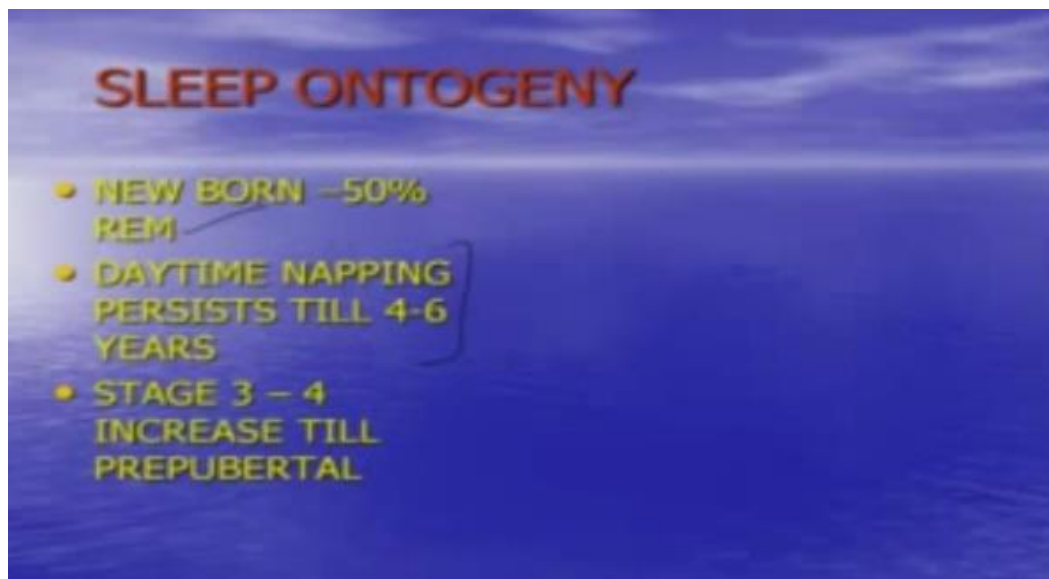
And so, now you can think when people – when there was no electricity people were working from sunrise to sunset. So they used to get up early probably that the conception, the myth or idea has come down then lock I should get up early you have, obviously you should get up early when there is a more sunlight you can work.

And as the sunset, there is people used to sleep early, but then they used to catch up the sleep by sleeping early till – so the number of hours remains the same. But this is important to understand, because if you are sleeping for a certain period says, for example eight hours, you're sleeping at 9'o clock in the night when there is no sunlight and get up at four or five you're quote of sleep is full.

And there you get up by sunrise and work. Now in modern times when you're working in artificial light the whole eight hours can be shifted here and there, you will sleep at 3'o clock in the night, you may get up at 11'o clock in the morning eight hours are over, but next night you will again be sleeping at the same time.

And that creates sort of disturbance and so your breaking the natural rhythm. So what is the ontogeny? Ontogeny is the development of sleep in a given person.

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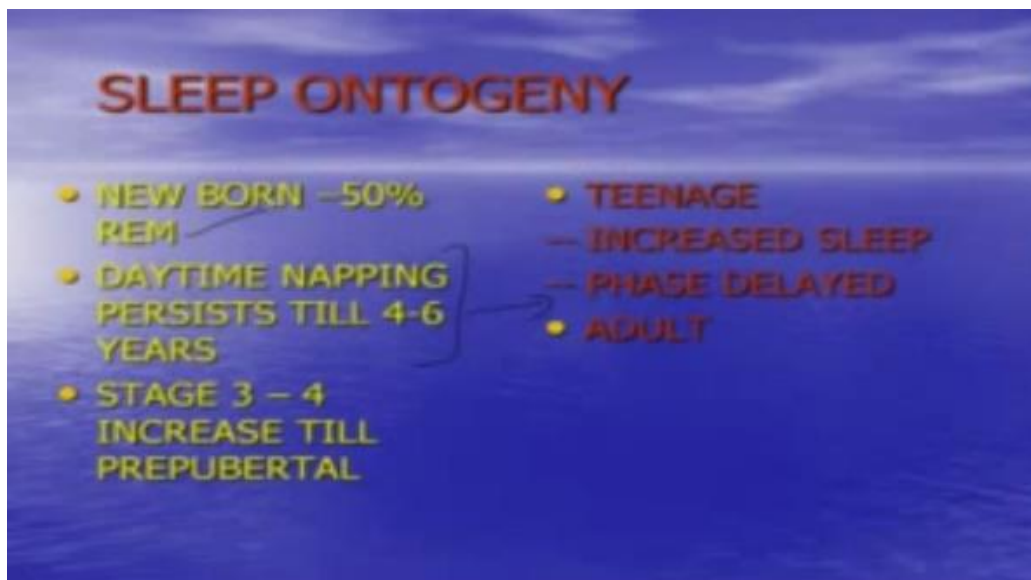


The new born sleep for about 80% of the time in their 24 hours and 50% of which is a REM sleep, REM is the dream sleep. Thus remember this term we will talk about it. Daytime napping

persists till about 4-6 years, so it's accepted that 4-6 years sleeps in the daytime. But imagine a adolescent will sleeps in the daytime creates huge intrapersonal problem with parent.

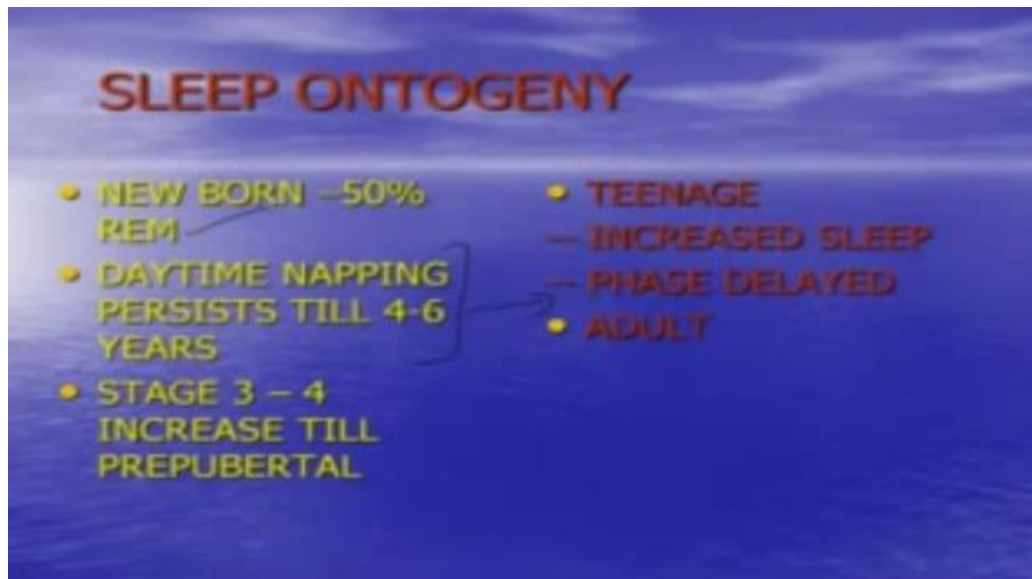
Because parents will come and say, yes that board exam and he is sleeping more. But that is a myth.

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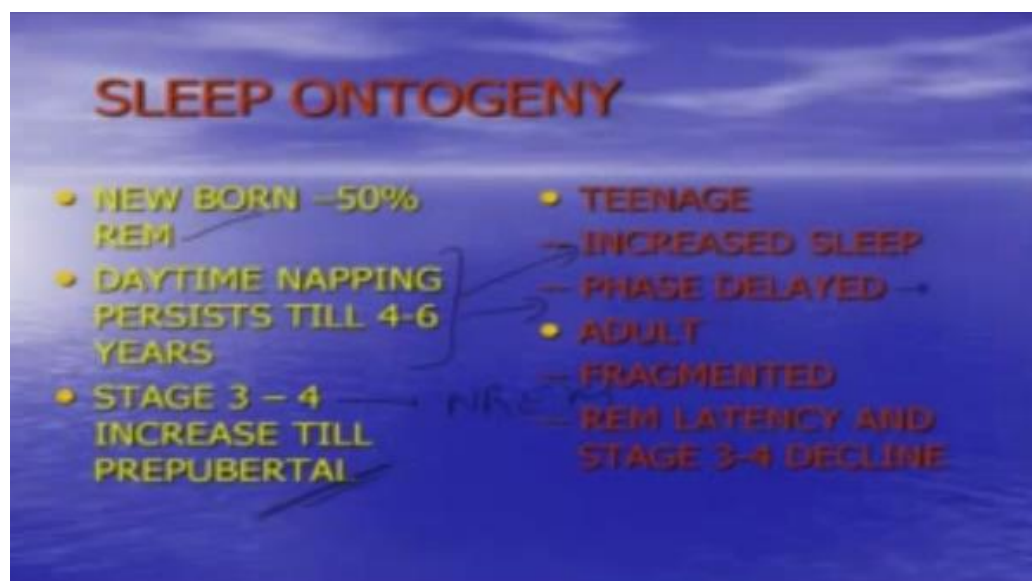
The myth is in the teenage there is a need for increased sleep like a child probably it is a growing brain which gets more and more information, the network is getting complicated all that information brain has to handle. There is a phase delayed, phase delayed in the sense as I said, they will sleep late and they will get up late in the morning which is a teenage problem or it is not a problem, it is considered as a problem. So in stage three, four.

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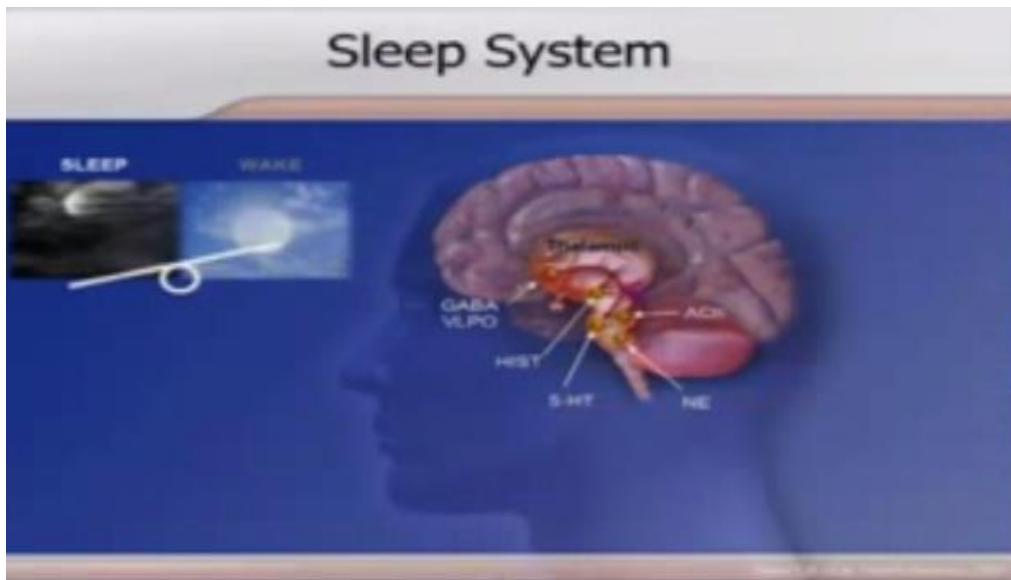
Which is the deep sleep and which is the non rapid eye movement sleep it increases till prepubertal age when there are lot of hormonal change in prepubertal, the mind is forming more complex networks and then there is a adult sleep.

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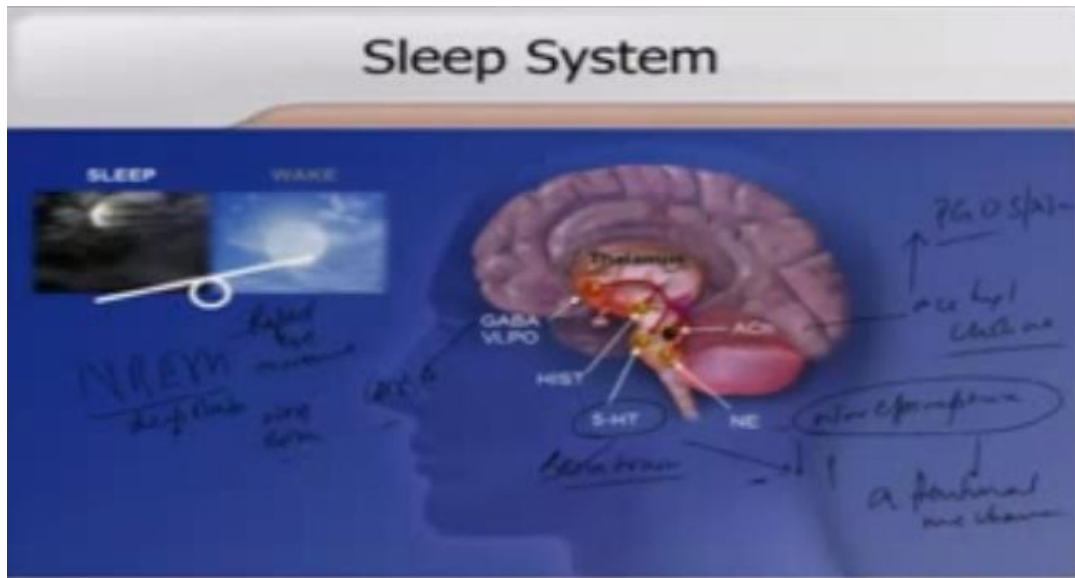
Which is fragmented, REM latency and stage 3-4. So the dream sleep in adults comes faster than as in teenager or a new born. The deep sleep decreases, so this is a natural way it happens. So if you try to understand it simply 50% of sleep in a new born is dream sleep is stage 3-4 increases, in a teenager the sleep, whole sleep pattern is more all though it is delayed in adults it is like fragmented.

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Now this is just a picture of a brain, the type of the areas of the brain which are involved in sleep control. Thalamus if you remember thalamus we talked about neuroanatomy which is the relay center and these are the neurotransmitters.

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5-HT is also known as serotonin. This is nor epinephrine, this is acetylcholine recall it from the initial and this is GABA. The interplay of all this regards of the sleep and controls the sleep like for example when the REM sleep is starting, REM sleep is the rapid eye movement sleep. Acetylcholine levels increase from this area and also we see what you call it PGO spikes.

This is a PGO is Ponto-geniculo-occipital, so from the deeper the Ponto area to the geniculo to occipital this whole spikes are seen. Acetylcholine increases which are a trigger of dream sleep. Serotonin levels are high with motor activity and by the time sleep once it happens when you're sleeping the serotonin level has to fall.

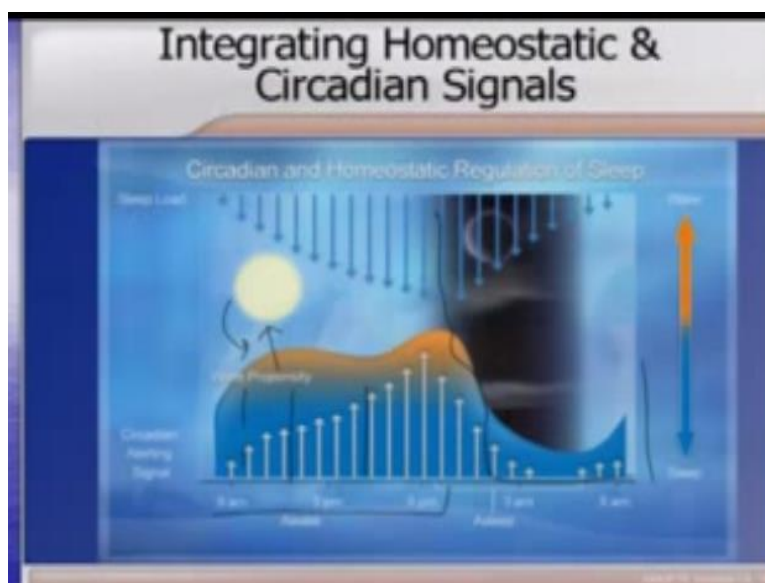
If there are high serotonin level the sleep will get disturbed, norepinephrine is the system which controls the attention or mechanisms. In deep sleep which is the – so let me tell you in NREM sleep which is a deep sleep. REM stands for rapid eye movement, rapid eye movement and NREM is non rapid eye movement. Now they are – how did we know about it? So just remember this brief terms NREM sleep which is a deep, which has stage 1, 2, 3, 4. Rapid eye movement which is the dream sleep, serotonin, acetylcholine, norepinephrine.

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So this is what I was talking about, there is a sleep load, circadian rhythm, this is sleep to 9am, 3pm, 9pm so if you see the whole thing goes towards sleep, this is a endogenous rhythm. So you're mind naturally has the pressure of waking up or sleeping.

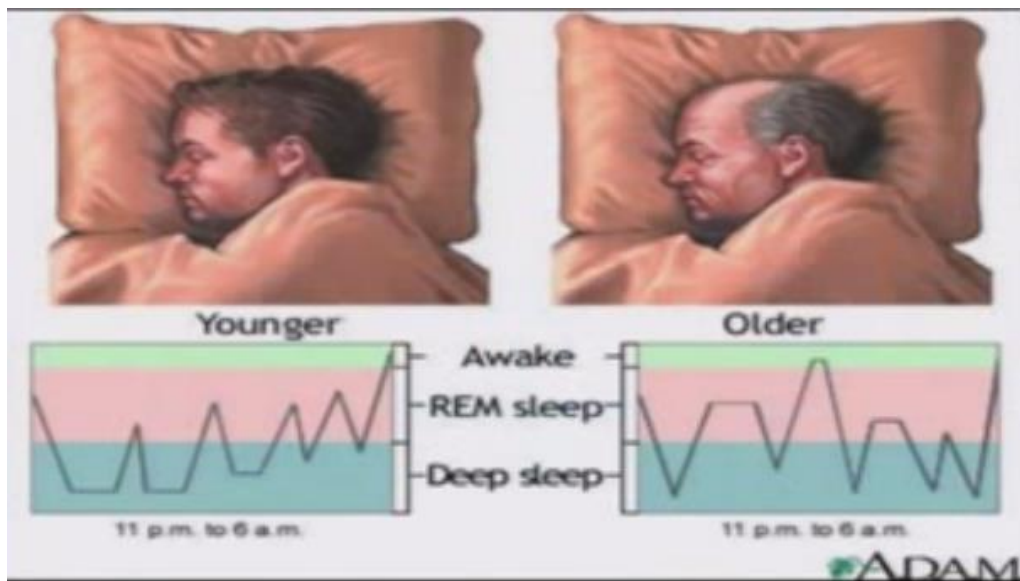
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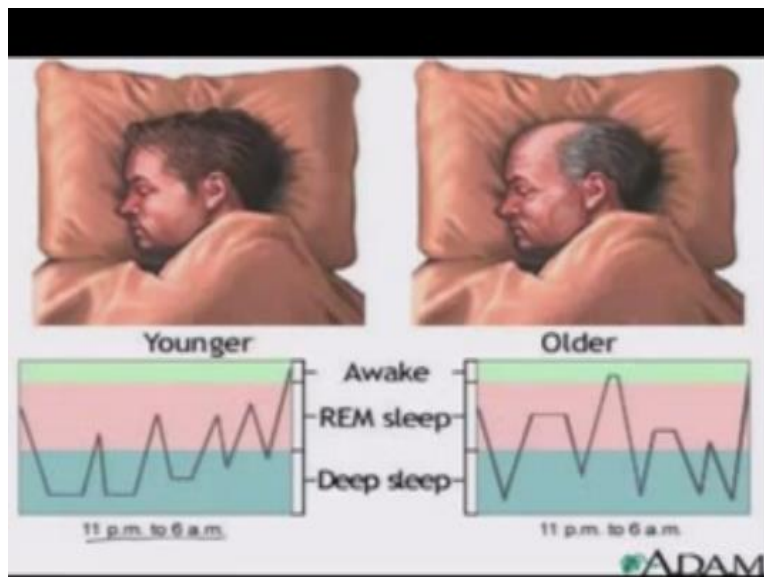
So this vapor upon propensity, tendency, coupled with the sunlight is very high between this times 9am to 9pm. But as the sunsets here you can see it. The vapor upon propensity goes down and you're sleep pressure increases, this is natural in all living mammals, animals.

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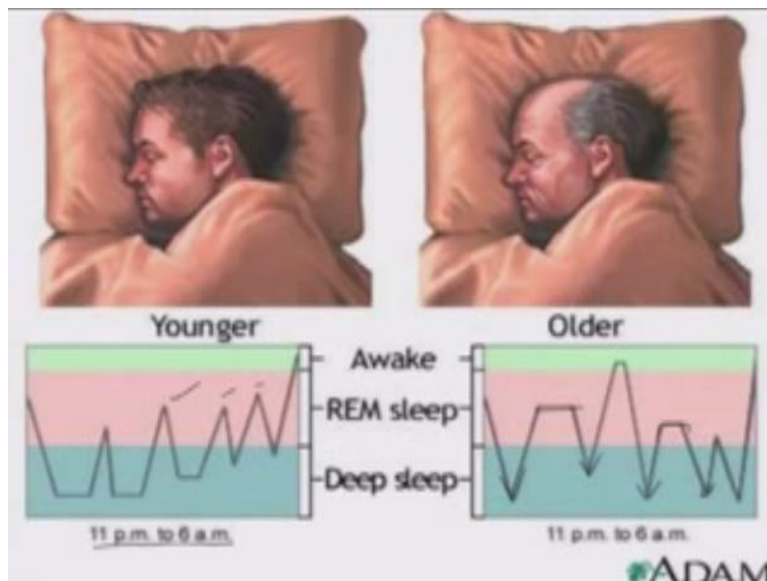
And this is the, this is what I was talking about in a younger person say.

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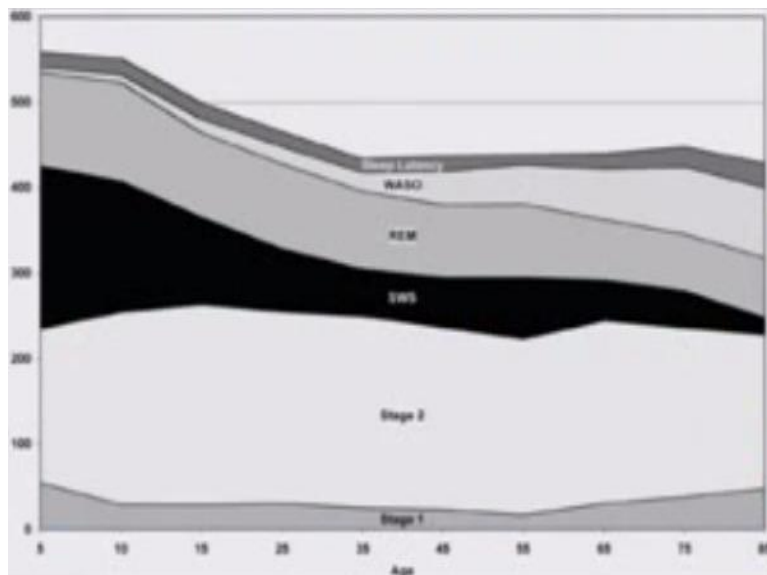
If you see at the 11 p.m to 6.00 what do you see is this pattern the lot of deep sleep as a night progresses is lot of episodes of dream sleep in the older person the deep sleep is very less even if it comes.

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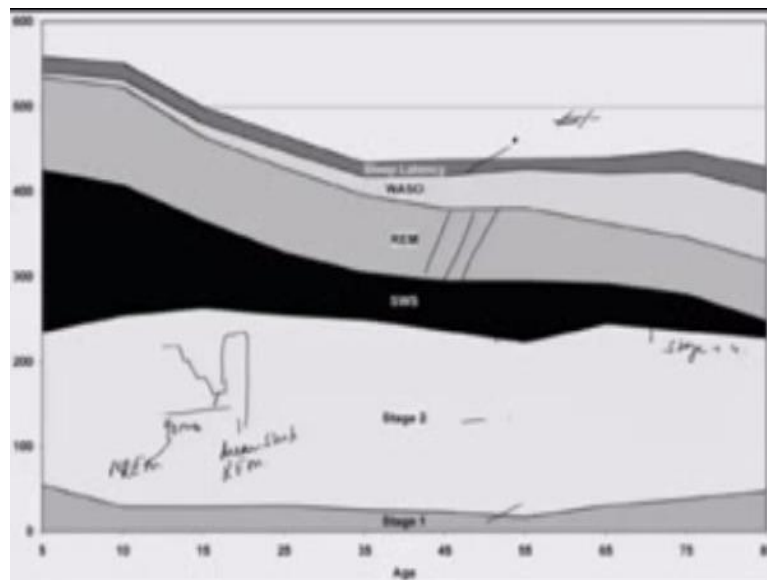
It is vice spikes so as you grow old.

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Now what is what is this let me see here sleep latency let me explain

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Is a period where you go to bed and the time you take to go to sleep this is sleep latency? REM sleep is the dream sleep slow way of sleep is the deep sleep. It is it stays three and four and then there is one stage one, stage two. So like when you go to sleep what happens is very simple you awake you to the stage one then to stage two then to then three and four, then and this whole thing is for 90 minutes in a normal cycle, 8 hours cycle if you record then there is a 20 minute period of dream sleep.

Which is called REM this is called NREM so what is happening is that you go off to sleep you go to stage one you go top stage two then you go to stage three and four that is a 90 minutes cycle, then you go to 20 minutes of dream sleep then you again come back to stage two, three four. Then again to REM sleep so over a night you keep oscillating between such a cycles. Now what is the difference how do we differentiate?

I will tell you how we record the polysomnography each of these states as a definite characteristic a definite frequency on EEG, I remember the frequencies of EEG alpha, beta, theta, delta. Stage three and four is characterized by delta sleep, so delta which is 0 to 4 .5 to 4 hertz is abnormal in a wakeful state. So in wakeful state if you do EEG and your finding that is abnormal but in sleep it is normal theta 4 to 7 is also partially in two words is stage two and stage three.

Is stage one as alpha which is slow down alpha is yet to 13 which is awake then is slowing down towards 8 and 7 hertz if you remember but this is not the only characteristic when you are in non-REM sleep, you what is relax the whole body process slow down, but you can still move your hand and all, but REM sleep is a rapid eye movement sleep. When we you are dreaming remember nature is very smart, nature as done.

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So this what, is followed by first REM episode after 90 minutes.

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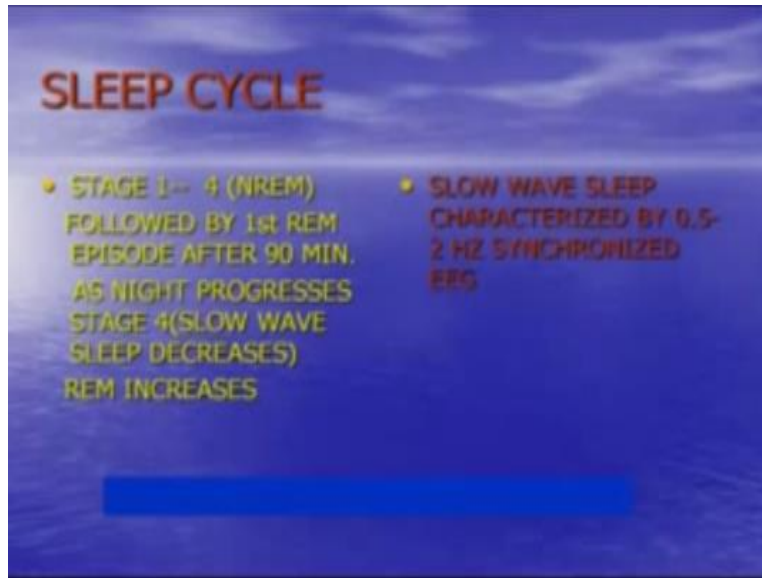
As night progresses stage 4 slow wave sleep decreases.

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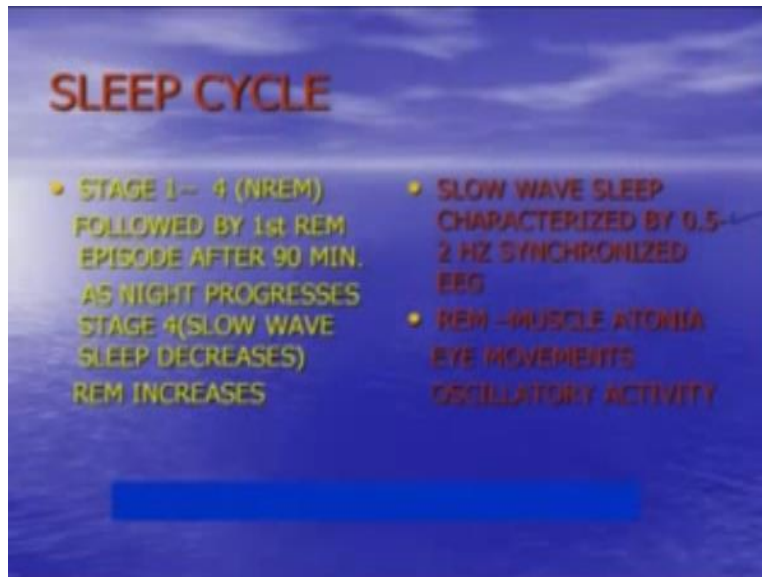
REM increases.

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So slow wave sleep is .5 to 2 hertz

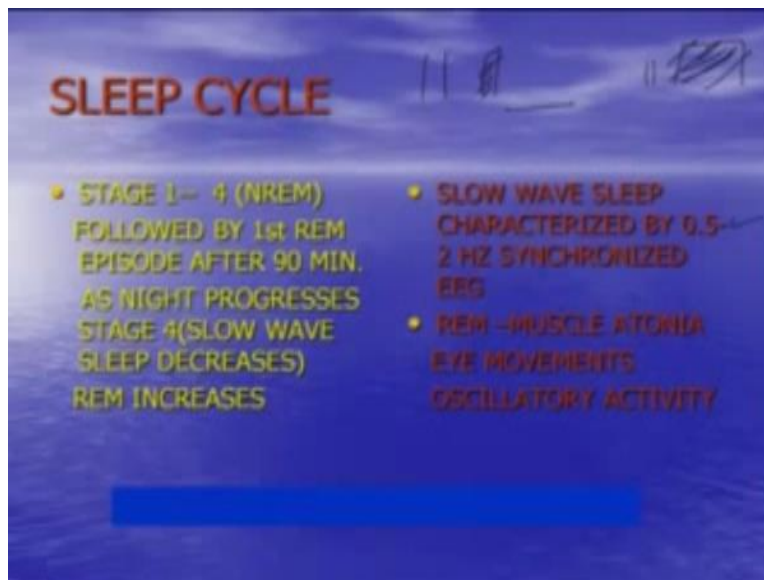
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Synchronized nature is smart when you are dreaming the EEG changes to almost like awake like a state. In those 20 minutes, 30 minutes and as night increase the stage for sleep decrease by 33% per cycle. Per cycle means from starting of sleep till the first REM cycle end of REM cycle

is the one cycle every cycle like this the stage four sleep decrease so when you are getting up in morning actually you are almost dreaming so when the night progress.

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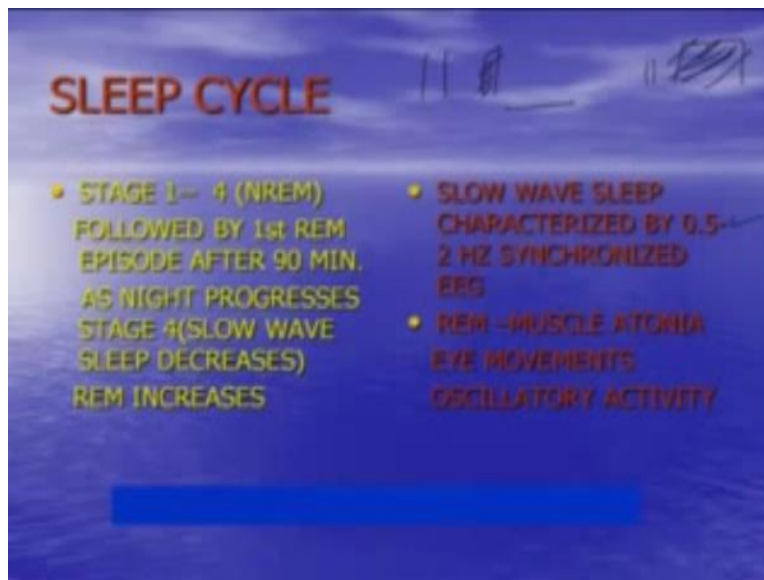
Suppose this deep sleep and this is REM sleep as the night progress that deep sleep decrease REM increases. So most of us if you look at your life you will which will get up in the morning while you are dreaming. What is REM nature is smart because nature always contrives to save you to make you survive, in that satiation if everybody acts out on your dream then you will hurt you self because your mind is not in control, so what nature does the only muscles which are working while your dreaming, is eye muscles which keeping moving horizontally or breathing muscles.

Rest of the body is paralyzed temporary paralyzed because the mechanism which control your muscle tone are shut off, why does it happen and why do I moves in evaluation when they where predators when people where living in jungles or animals living in jungle they always had to even the sleeping they have to be careful that they should not be eaten up, so probably that the is the evolutionary s mechanism by which I if even if you close your eyes your eye ball keep scanning.



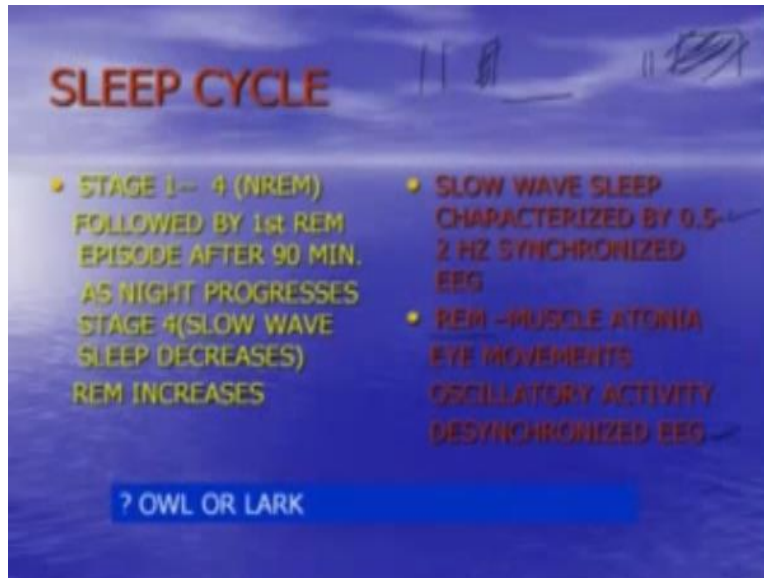
The environment for many thread so cats and other animals, who live in sleep in a lighter stage there eye is keeping scanning and they immediately are on if there is a thread, but that as continued in us, muscle Lithonia so that you are dreaming and you do not want to really act out on your dream you want to where thinking of muttering some body and your muscles have paralyzed you can think of muttering but you do not go and kill. And breathing muscles of course because of breathing

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So and that is why we call it rapid eye movement we see this rapid eye movement the muscle movement are gone and your breathing muscles are on and the EEG is almost like a awake EEG

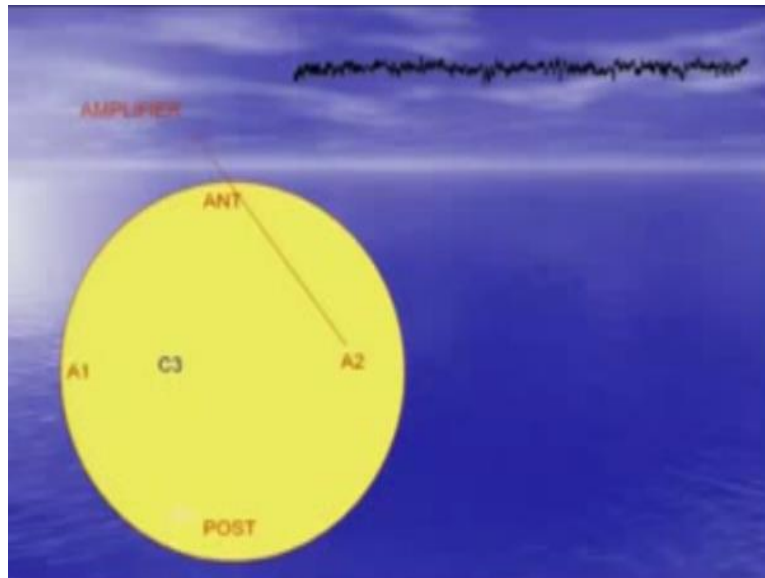
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Now given this pattern of sleep in normal people for about 8 years we also have entrenched rhythm? You remember I told you about the endogenous rhythm, each one of us is different so all this fight around that you can, not study in the night or you can, not get up early in the morning, there is no point telling people because some people are night owls and some morning larks.

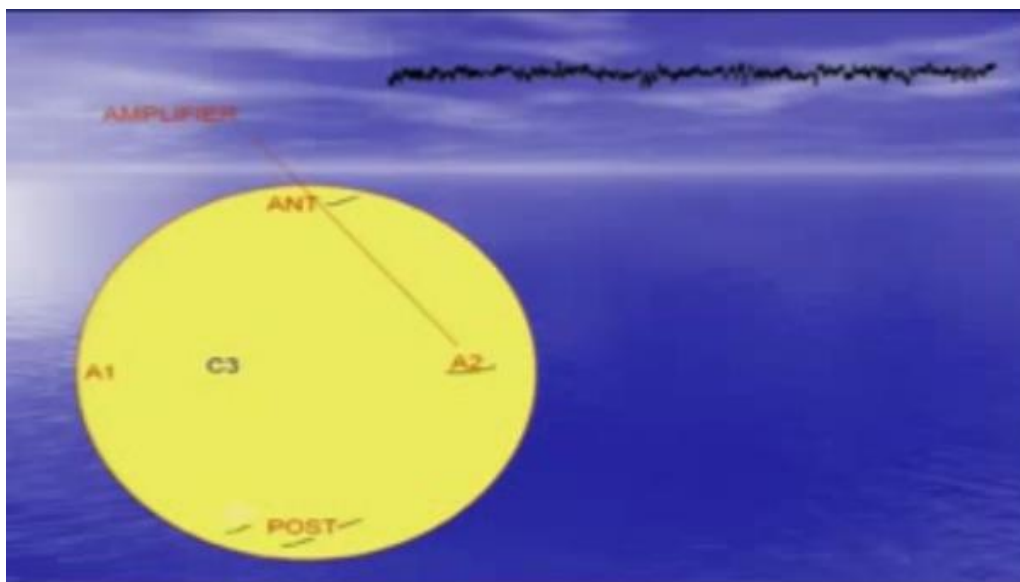
There are some people who will get up early in the morning and function best, and there are some people who function best at the night in a healthy individual it can be altered because sleep is a wonderful capacity of adjusting, so when you are pressed for work you can sleep less and still survive, but sooner or later you have to compensate for it you can't, not go compensating without sleep you can change your rhythms depending on the circumstance but more or less you have your own core pattern of endogenous rhythm. So this is how we record actually.

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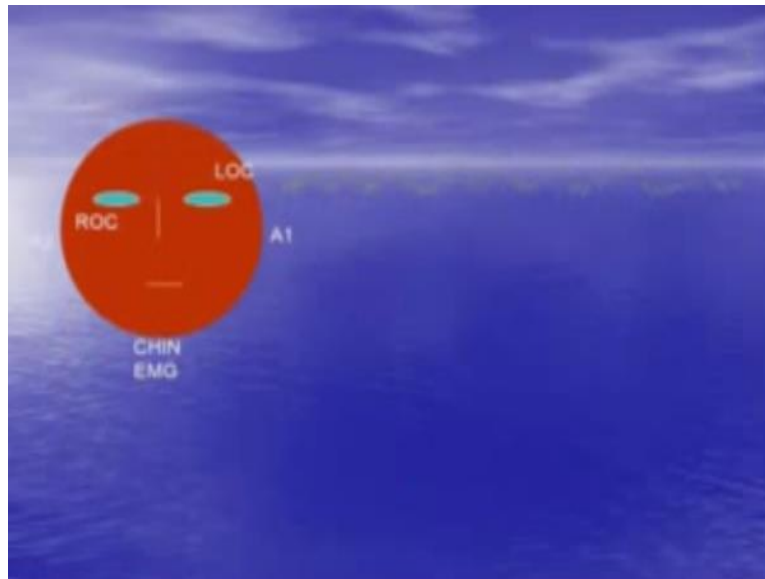
If you look at it, so we just put a EEG is the anterior the posterior that us a front anterior, posterior is back of the head.

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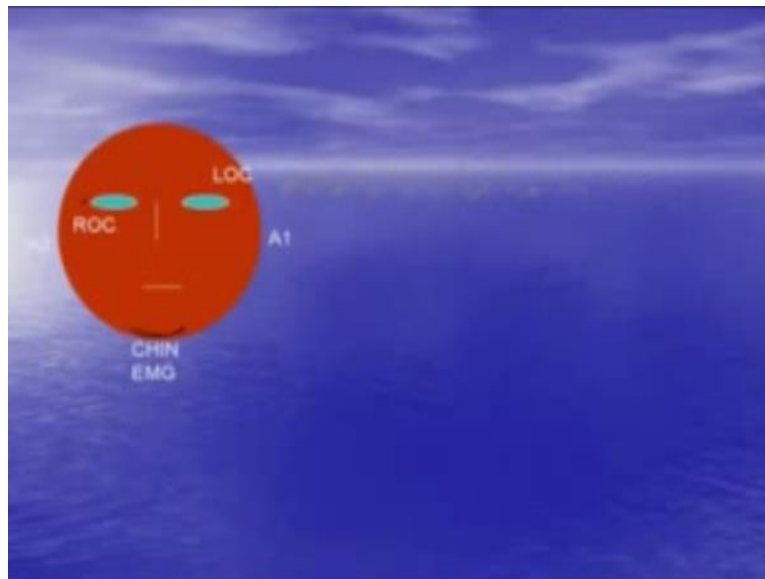


This is occipital to visual low this is so what do we do

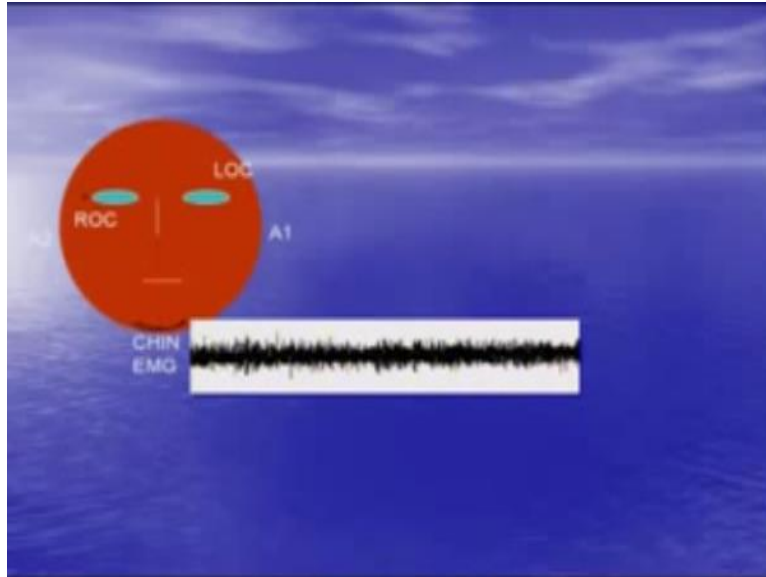
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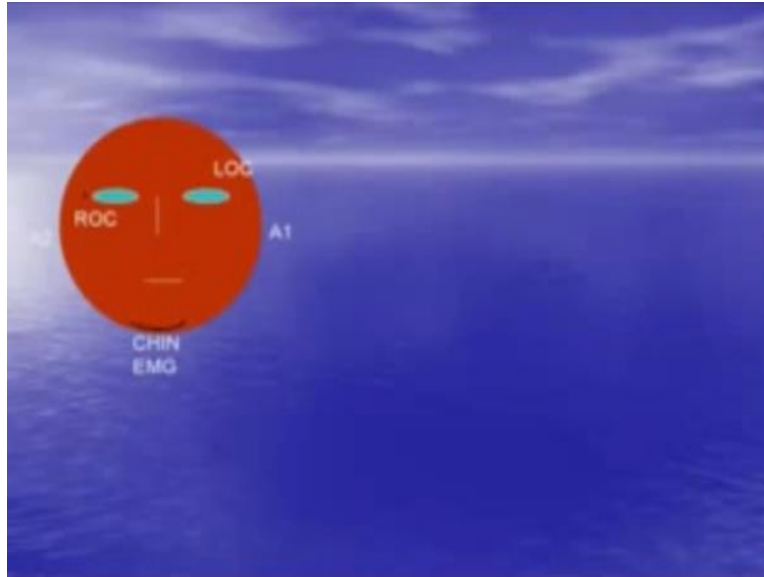


Is if we put things like this.

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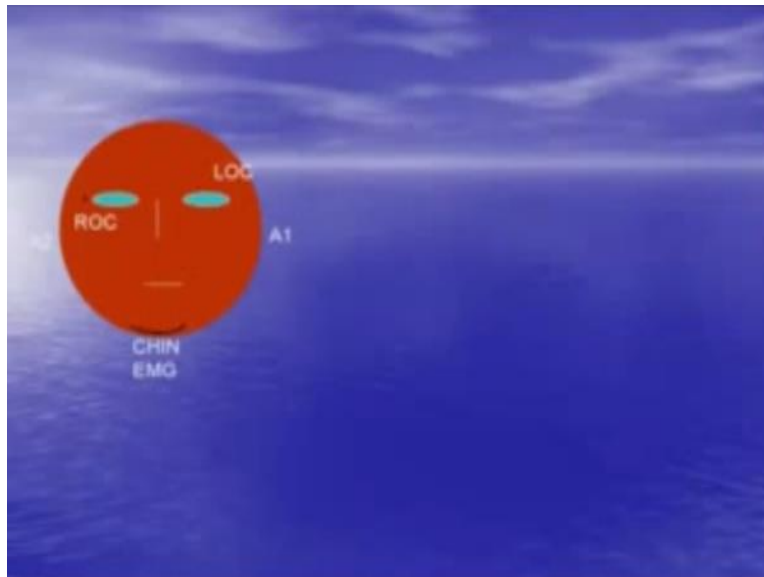


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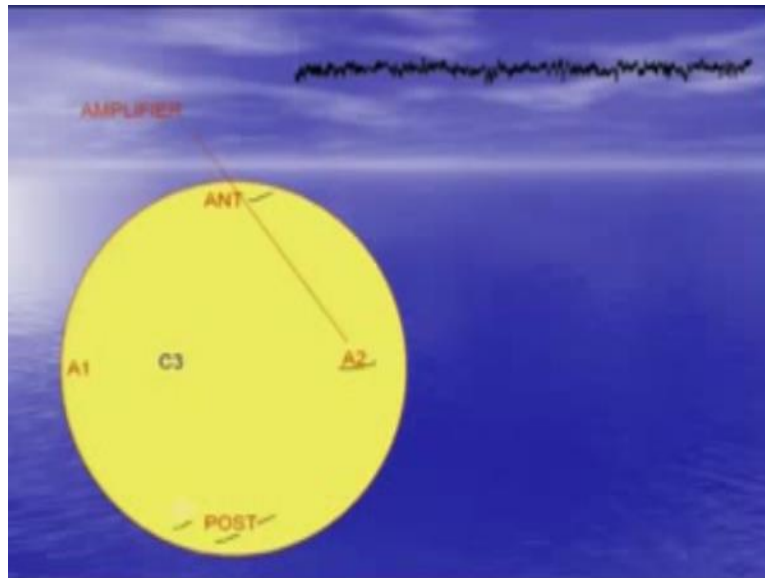
We will put one channel one channel on the eye here and one channel here to catch up eye movement we put something here on the chin.

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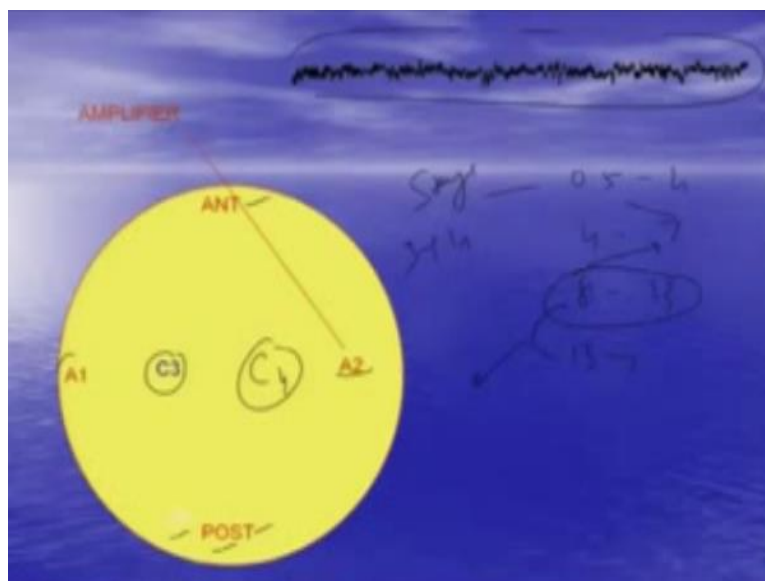
Chin gives you enough to tell you whether the muscle tone is increasing or not and this pervious.

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Thing which I should was EEG.

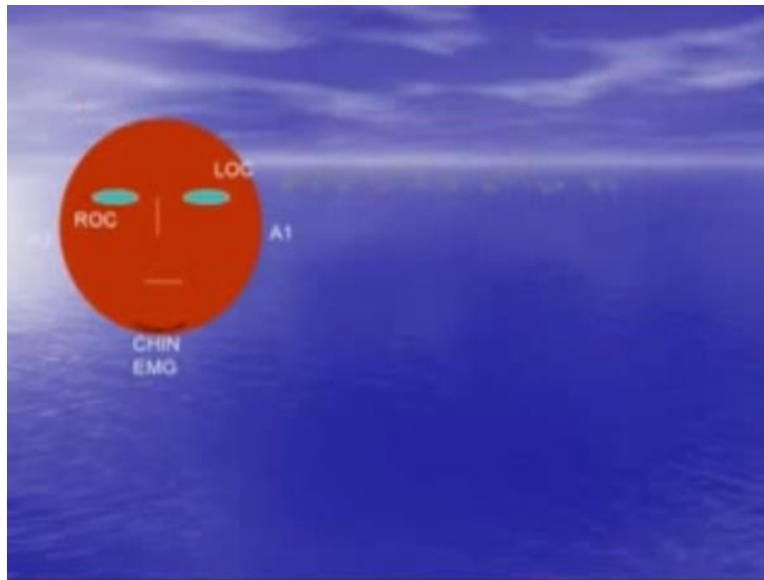
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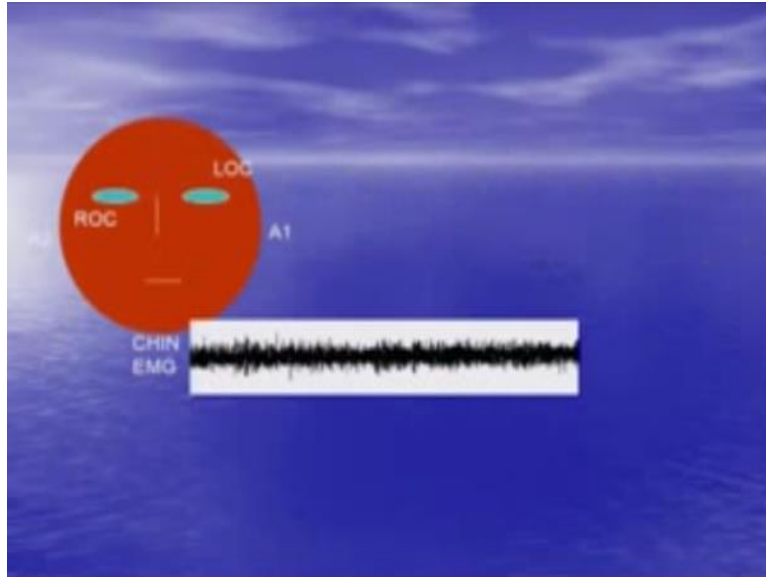
We just put one or may be put two on both side to get such one or may be put two on both side to get such pattern of EEG so EEG as I said rhythms .5 TO 4 , 4 TO 7, 8 TO 13, 13 onwards. So this is a normal awake this keeps decreasing to this as sleep on set and this is the stage three and four in REM in this is the pattern which we see desynchronized.

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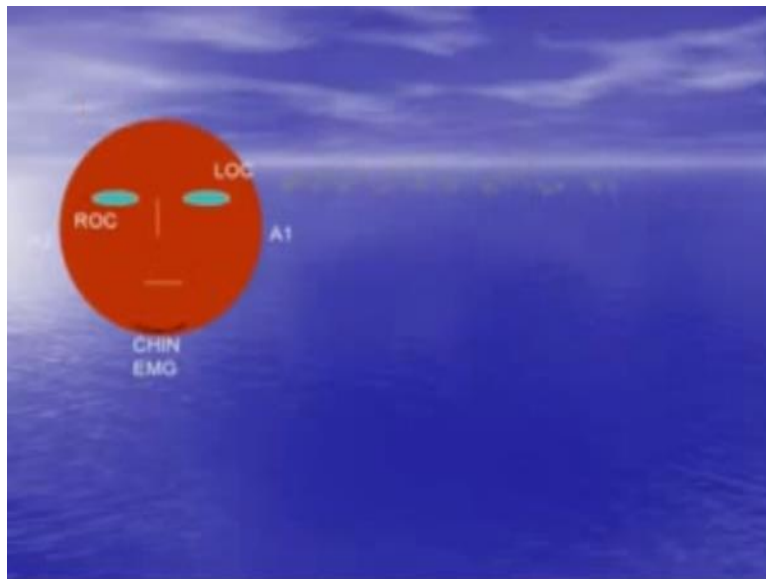
Awake.

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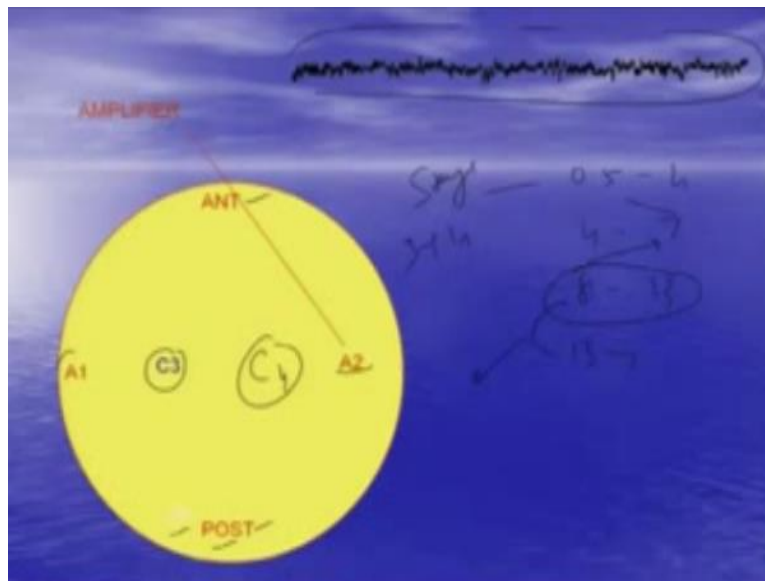
See this is the type of the stuff

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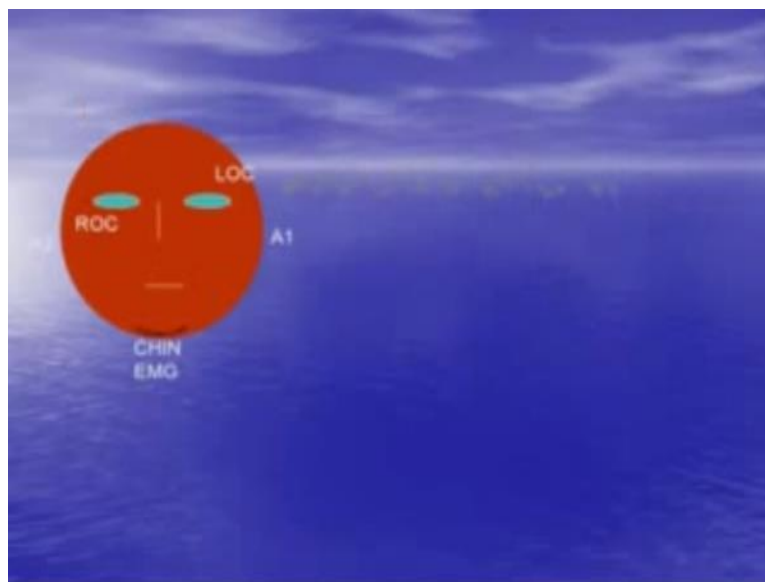
You just notice it.

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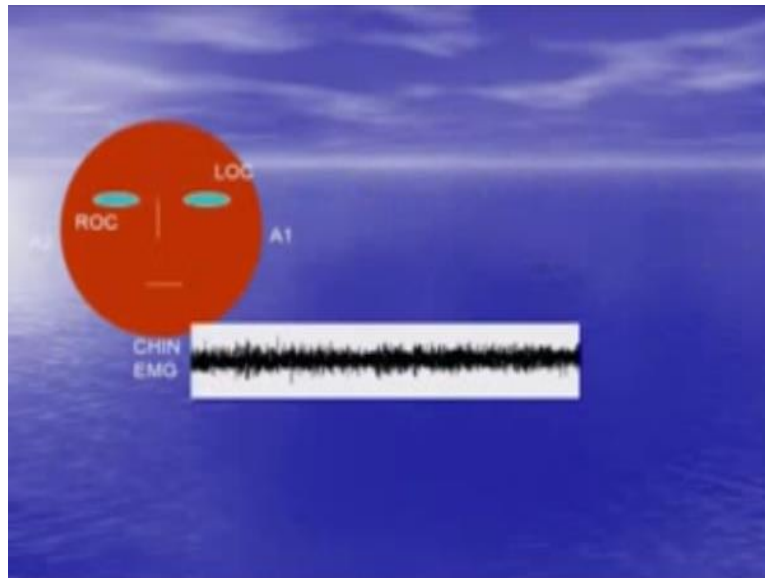
As I change the slide.

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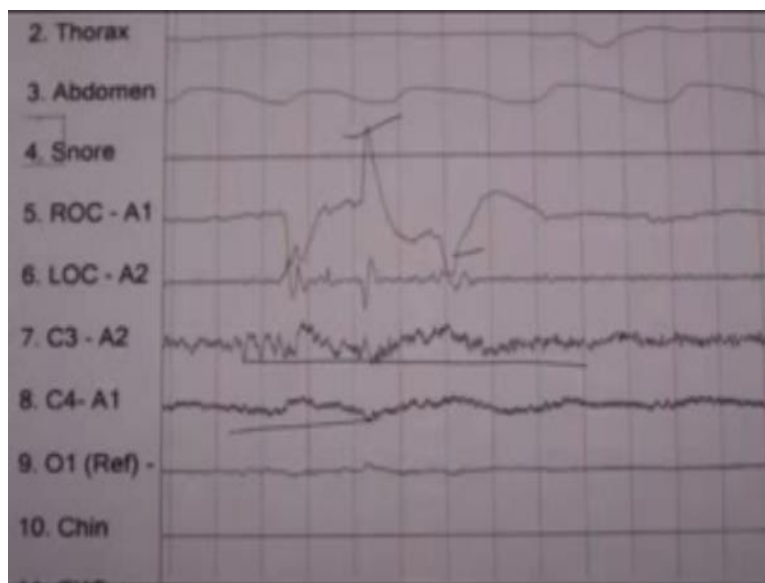
You can see this.

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This is the muscle normal muscle tone normal muscle tone.

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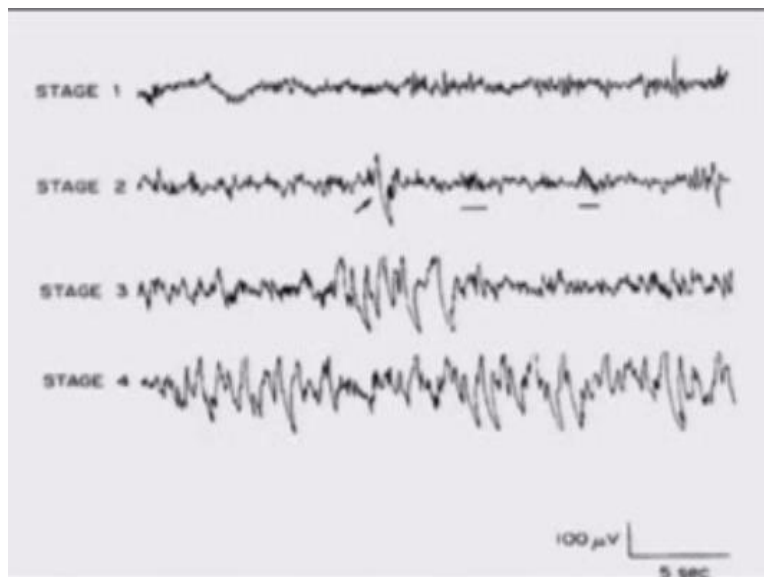
And this is what do we get on a record income this a paper rerecording but on paper see these are the eye movements.

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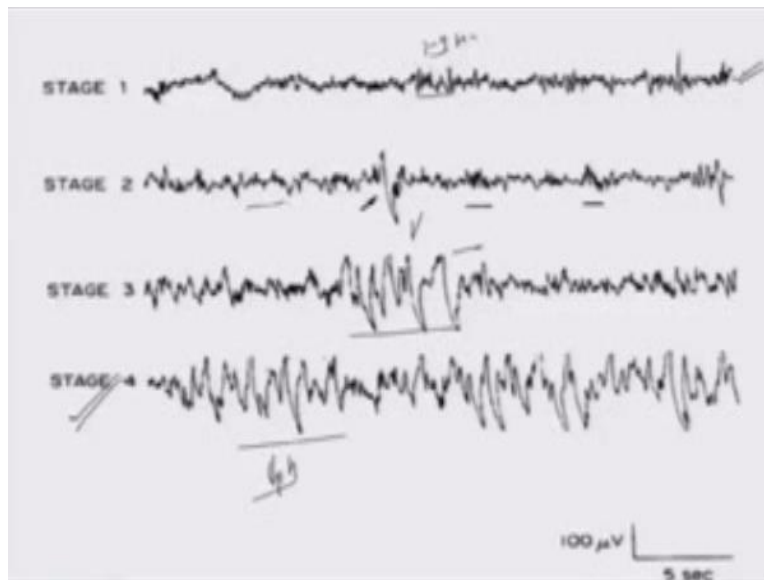
This is the EEG this is the chin thing, muscle alright.

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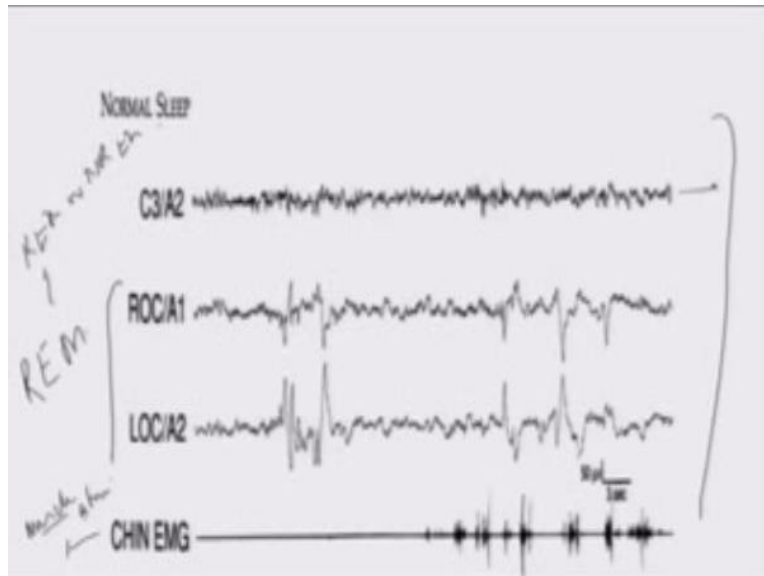
So in stage one you can see the difference the stage one looks like.

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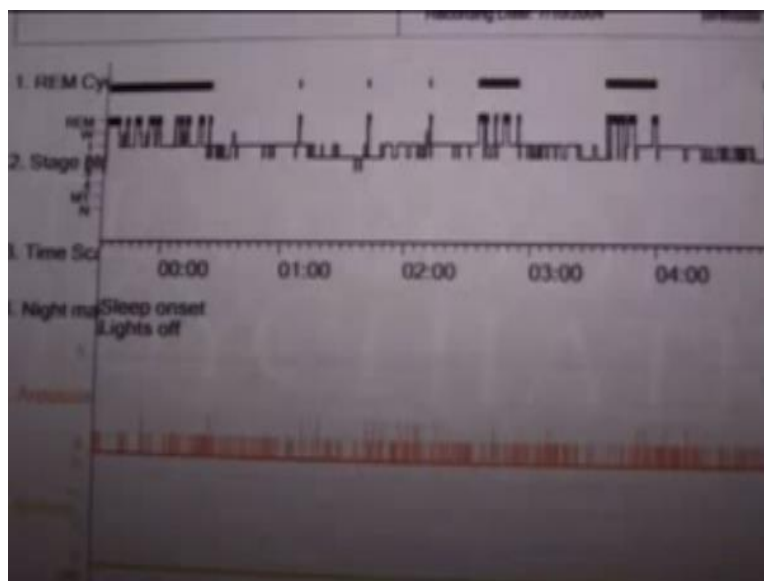
This is a normal wake may be somewhere around if you just take this much this is five second within one second you have to see how much frequency around 7 or 8. 1, 2, 3, 4, 5, 6 so somewhere around 7 TO 9 hertz is stage two if you see it's slowing down the stage three is further slows down and what you start getting your sleep is pencils and K companies what you call and this is slow this is totally slow down this is parts, 1, 2, 3, 4 okay is amoral when you see in wake people in sleep it is normal

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Sleep this is what you see chin EMG why do you need this because you want to see what you call rapid eye movement and you want to see muscle dis-trait. So muscle dis-trait and this together we will tell you whether person is in REM or NREM, EEG will tell you but EEG in it self will not tell you whether it is NREM OR.

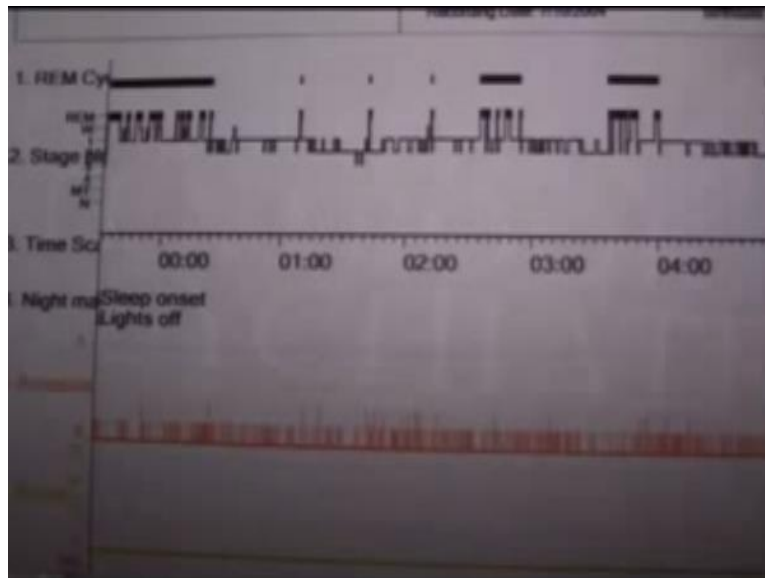
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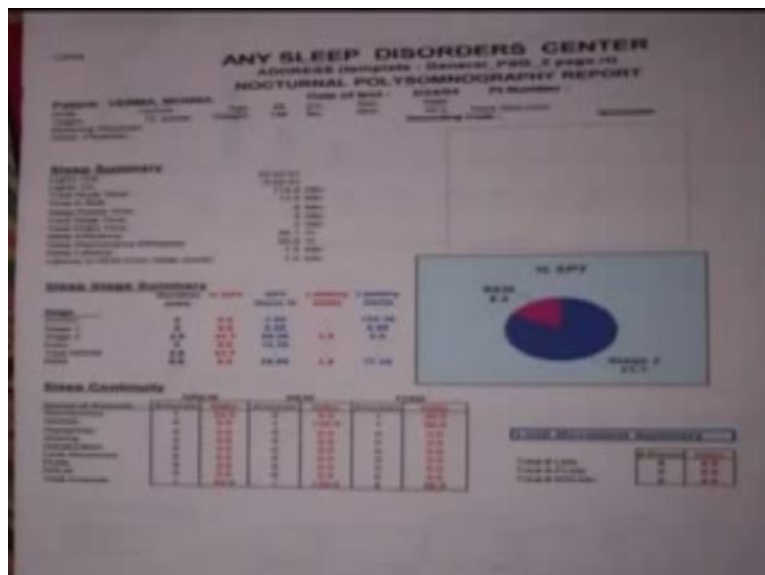
REM and this is what do we get we call at this hole recording of total full night is call polysomnography somno is sleep poly is multiple channels and graph so this is what you get

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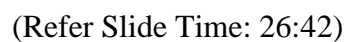


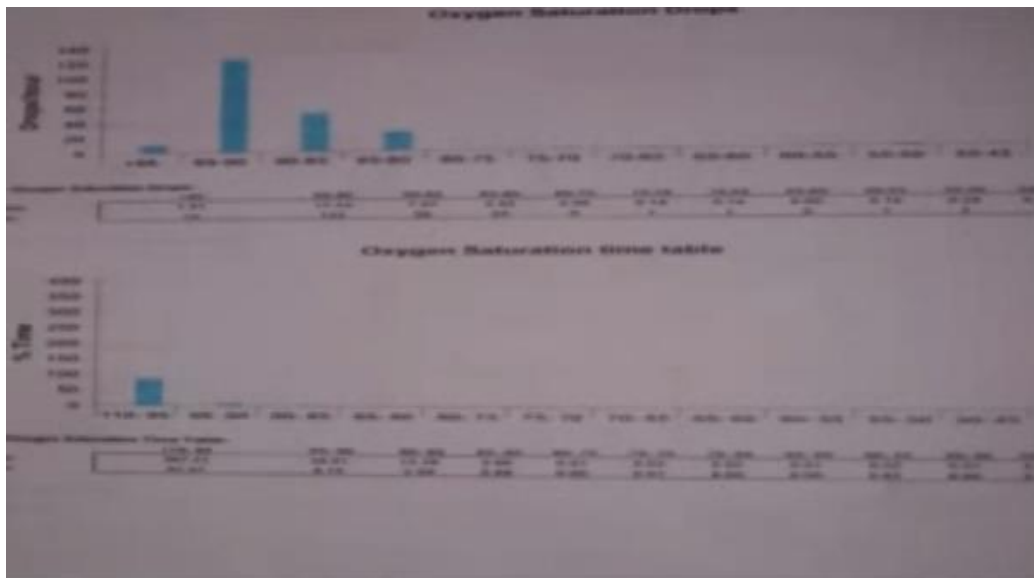
So you get how may time the person really get up when was the sleep on set these are awake 1, 2, 3, 4.

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Oxygen saturation how many times oxygen fell in the body.  
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	Apnoea	Control	Submerged
Collection Time	01	01	01
Apnoea	01	01	01
Control	01	01	01
Submerged	01	01	01
Apnoea	01	01	01
Control	01	01	01
Submerged	01	01	01

	Apnoea	Control	Submerged
Collection Time	01	01	01
Apnoea	01	01	01
Control	01	01	01
Submerged	01	01	01
Apnoea	01	01	01
Control	01	01	01
Submerged	01	01	01

	Apnoea	Control	Submerged
Collection Time	01	01	01
Apnoea	01	01	01
Control	01	01	01
Submerged	01	01	01
Apnoea	01	01	01
Control	01	01	01
Submerged	01	01	01

Respiratory Disturbance Index (RDI): 0.00

Body position.

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Okay so now before we I come and take to you about the disorders understand because sleep is naturally required and sleep keeps where from birth till your old age which is in a natural process the lot of mitts which go around it people come and ask at how many hours are required somebody may be okay with 6 hours some body may not be okay with 10 hours but largely as I said 4 to 10 the need for sleep adolescents increases.

They have a phase shift also they will never see but ten 'o clock and get up at six that rhythm is already gone because of the modern life style there is also smoothing call what you call after noon stays 8 hours after getting up from sleep there is a pressure of sleep which is call a after nape. It is a natural and normal; thing that problem is that we are leaving in a modern life style where we find pride in running and not sleep and not thing and not taking decode rest.

So some people who sleep in the afternoon for half an hour at 20 minute sir 30 minute nape eight hours after geeing up s normal it actually freshest up for the rest of the day but people think it is abnormal so it is a pride not sleeping the afternoon but that is not a pride that is actually a living against nature adolescents sleep more pattern always get into conflict exam time what the

problem with exam time in that in the board exams come when people are 14, 15 to 18 and they are they need more sleep plus.

Their sleep pattern goes into a phase delay they will sleep late get up late we are still hooked on to the same light to the sunlight pattern the brain is also trained to a light pattern but artificial lights plus all this gadgetry which we use this lot of information which goes into the head as to be processed with the brain so in time of his studies some people sleep more because which is their mind needs to process more the lot of information which goes into the head in the during the dream sleep the brain will normally try to fit in.

And so in that sense everything which is related to sleep is not a problem, sleep also has a good way of bouncing back as and when you have a problem it may go down, it may come up and largely your patterns remain the same.

So now I will talk to you about how do you approach the problem of all the symptom at all which is associated with sleep and the common things which you – whether you are a doctor or not you can always be advisor, where a lot of these things come up in families which are some of them are normal developmental issues. Okay so we will look at – treat these lectures in continuity.

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General approach, I will talk about this general approach to sleep problems which you may encounter anyway in your life in that last lecture of this course. See you in the last lecture, thank you.