Sleep Disorders 202

(How to tell if your patient has a sleep disorder and what to do about it)

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What do sleep disorders look like?

- Is it only snoring?
- Are they always fat?
- Why does everybody seem to be wearing those “sleep mask things”?
- Is it “normal” to have a sleep disorder now?
- Could I have a sleep disorder?
- How can I tell if my patient has a sleep disorder?
- Can it happen to kids?

“How’s your sleep?”

- This is the question I start with, but there are several others that need to follow in order to get the information you need.
- Many people think it’s normal to get up several times to urinate at night,
- We tell the males it’s their prostate, the females that their “bladder has fallen”.
- We’ve been told that we can’t fall asleep because we “do too much”, “watch television”, have “too many stimuli”.
- Therefore, many people who are seeing a doctor for hypertension, high cholesterol and back pain think their sleep is “normal”.
- It *is* like everyone else around them but it’s not “normal”.

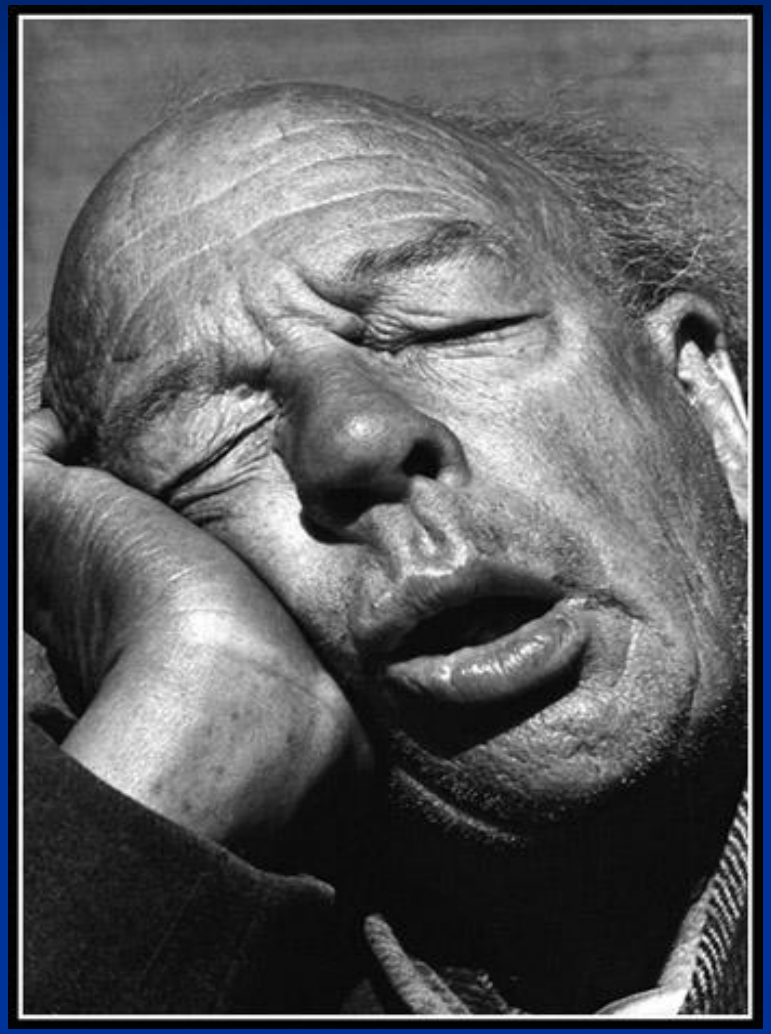
What comes after “How’s your sleep?”

- What time do you go to bed?
- What time to you go to sleep?
- Do you wake up during the night? How many times?

“Yes but_____”

- Do you fall back to sleep right away?
- Do you have cramps in the night?
- Are your legs restless while you’re falling asleep?
- Do you snore? Do you kick?
- Do you need more sleep than you think you should?

What questions to ask



- Do you wake up with pain in the morning? “Yes but_____.”
- Do you take a sleep aide or medicine?
- Are you tired on awakening?
- Are you tired or sleepy during the day?
- Do you take naps?
- Do you feel better or worse when you wake up?
- Do you sleep in a chair or on the couch?
- Does your spouse see you falling asleep in your chair in the afternoons?
- Do you work nights or swing shifts?

Other questions to ask

- Do you act out your dreams?
- Have you ever awakened and been paralyzed for a couple of minutes?
- Do you ever have dreams while you're pretty sure you're awake?
- Do you have trouble with your memory?
- Have you ever had a sleep study?
- What did they tell you about the sleep study?
- If the doctor's sleep is abnormal and he thinks it's supposed to be like that, it's unlikely he'll think his patient's sleep is anything to worry about.

Sleep for normal humans, even “old” humans

- Fall asleep 9:30- 10:00 pm, wake easily to roll over but fall right back to sleep.
- Wake up at 6:30-7:00 am.
- Have no pain on awakening
- Do not get up to pee, poop, or eat.
- Do not stay awake in the middle of the night with their “brain racing” or “stressing”
- Abnormal sleep is not usually caused by “stress” .
- All animals deal with stress by acting out scenarios in REM sleep. They also make chemicals that calm them

I thought old people needed less sleep

- We all sleep worse before we die. (Assuming you don't get hit by a bus.)
- Abnormal sleep makes us age faster.
- Feeling "old" is not about one's age, it's about how one has slept the night before and the years before.
- Elderly people who are sleeping badly can be healed by improving their sleep, just like everybody else.
- The one group that does not seem to have a sleep disorder is the true Alzheimer's patient. They have few or no medical problems, look perky, and you only know something's wrong when they tell you the president is Abraham Lincoln.

Is sleeping in a chair normal?

- Humans lie down to sleep because they get paralyzed in deep sleep.
- Why do some people feel worse when they sleep in the bed?
- When they sleep upright their airway stays open during paralyzed phases of deep sleep and they have less apnea.
- They are not aware of this, they just “feel better on the couch” or “can’t sleep in the bed” have “more pain in the bed”
- Their body is telling them they get better sleep in the chair, but that is not normal, it means they have apnea.
- Humans slept on the ground for thousands of years and did not have pain on awakening, it’s not the mattress!

What if they say “my sleep is fine”?

- If the patient is healthy, happy, has no pain and is on no medications, coming for an annual visit because they’ve been told it’s good to do so, then they really do have normal sleep.
- If they have high blood pressure, a pacemaker, atrial fibrillation, renal insufficiency, stroke, headaches, knee replacements, back pain, acid reflux, cancer, tremor, bad balance, B 12 deficiency, anemia, renal failure, or heart disease . Then it’s likely they have abnormal sleep and don’t know it.

Can they have abnormal sleep and not know it?

- Yes: I think there are two main groups:
- People who have always slept badly may say “I sleep fine” meaning that they sleep the way they always have; badly. You need to ask them a few more questions before you’ll know this.
- People with parkinsons disease are frequently unaware that their sleep is terrible. (We know this because of sleep studies.)

Dopamine plays a large role in sleep

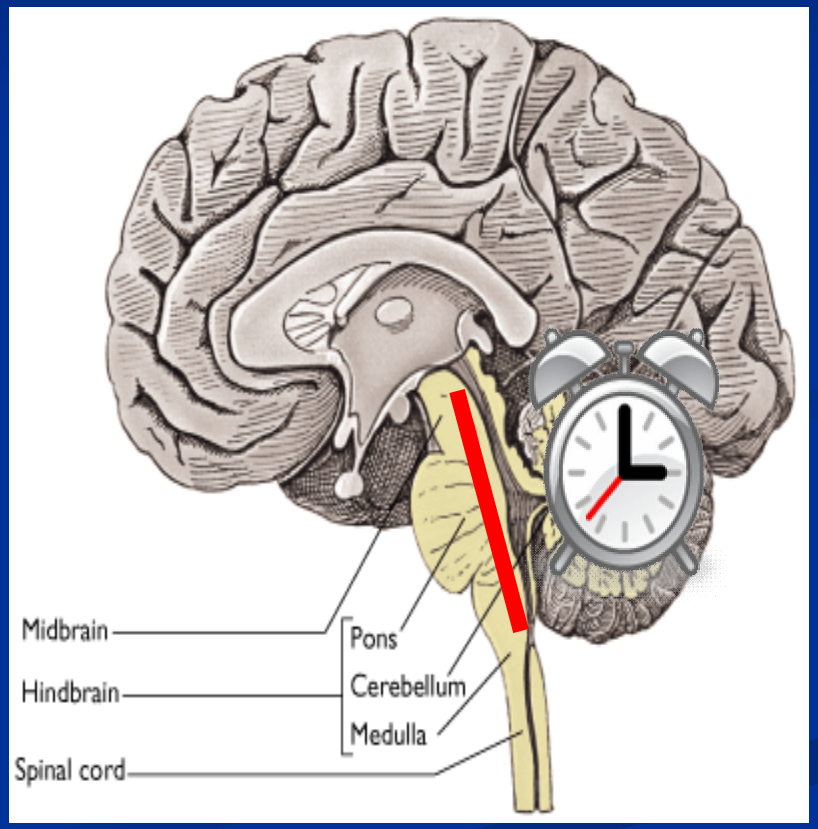
- Why are people with parkinsons disease unaware that their sleep is terrible?
- Why don't they feel tired on awakening like my other patients?
- They get up to pee 3-4 times, remember we told them it was their prostate so they think that's normal.
- But their spouse will tell you, if you ask, that they fall asleep in their chair right after breakfast, and any time they sit down.
- Frequently the patient will look at them and say "I do not".
- The patient may be unaware that they fall asleep in their chair because their sleep is no longer preceded by a drowsy phase.

Dopamine plays a large role in sleep

- Retired people with normal sleep get drowsy after lunch, "honey I'm going to take a nap". They go to the bed and take a nap and feel better afterwards.
- They do not fall asleep repeatedly in their chair.
- We have become accustomed to seeing elderly people sleeping in their chair because it is common, not because it's really "normal".
- It is also a sign of a sleep disorder.

Dopamine plays a large role in sleep

- I think the parkinsons patient, even early on before they look flagrantly parkinsonian, doesn't feel tired in the morning because they have less dopamine than normal.
- Residual dopamine makes us feel sleepy in the morning.
- It's telling us "come back to bed, we're not finished yet"
- We haven't really finished our deep sleep phases.
- Those who are lacking in dopamine have sleep disorders that can be seen on sleep studies 20 years before they have any physical signs of parkinsons disease.
- At first they may know they don't sleep well, many years later they say "I sleep fine".



How do I know that they will develop parkinsons 20 years from now?

- Family history of parkinsons
- Family history of going into a nursing home because of falling
- Family history of tremor
- Mom *is* using a walker, but she has "bad knees" and back pain. Mom has a sleep disorder too.
- Your patient has knee pain too. It's starting 20 years earlier than it did in his mom because his sleep disorder is coming even earlier due to low vitamin D.

Sleep deprivation kills

- Most of the patients I see in the hospital with stroke have vitamin D's below 20 .
- But D deficiency is not the only thing affecting the sleep.
- The patients who are in the hospital with a stroke and a vitamin D of 30 often have a second sleep issue, either night shift work or dopamine issues.
- Anything that worsens the sleep makes us age faster
- Low D is one risk factor for a sleep disorder, dopamine deficiency another, shift work another.

Can it happen to babies?

- Normal, healthy babies sleep 14-16 hours.
- They wake up, nurse, and fall asleep at the breast.
- They are developing their brain while they sleep,
- If the brain does not develop normally in the first years of life autism may result.
- If there is not enough time spent in deep sleep for the brain to develop it has to triage what it works on first.
- Individuals can still survive without social skills. they're less likely to reproduce because we think they're "weird" but they'll still be able to live.

Can it happen to babies?

- “Colic” is not a diagnosis, it is an admission of ignorance.
- American Society of Pediatrics recommends 400 IU of vitamin D per day in babies that are breast fed because there is no D in the breast milk.
- Bottle fed babies get D in every bottle.
- As we’ve moved to more breast feeding and keep the babies out of the sun at our physicians’ direction autism has become more common.
- Dark skinned immigrants to this country have a higher incidence of autistic children than in their native country.

Can it happen to pregnant moms?

- You can't sleep. "Cause you're pregnant"
- You're cranky and can't think properly. "Cause you're pregnant"
- Your legs are swollen. "Cause you're pregnant"
- Your back hurts. "Cause you're pregnant"
- You have reflux. "Cause you're pregnant"
- If mom is D deficient and not sleeping , baby is also D deficient and not sleeping.
- Pregnant moms are much bigger than babies but still only get 400IU/day? Why is that?

Vitamin D level of 60 during pregnancy

- Pregnant woman with D levels of 60-80 during pregnancy
  - sleep well,
  - don’t get fat,
  - don’t get reflux,
  - carry their baby to term
  - don’t have to spend 6 months in bed and
  - don’t get eclampsia

Can it happen to kids?

- Kids who sleep normally wake in a good mood, rested, ready to be curious, run outside and have fun.
- They don't hurt, they don't have a runny nose.
- They don't look tired.
- When they look tired, they are tired, even if they've been that way since they were born, and even if they've slept 12 hours.
- They are not depressed and cranky.

Can it happen to kids?

- Kids who do not spend enough time in deep sleep do not make antidiuretic hormone. They make too much urine and they wet the bed.
- Adults with the same problem get up to pee, neither is normal, both reflect inadequate amounts of deep sleep, both are vitamin D deficiency related.
- Children with ADD who are given stimulants get better because they did not make enough of their own stimulant chemicals last night, they are not sleeping normally either.

Normal Kids

- When you wake up and your four year old is standing quietly at your bedside grinning at you, not yelling or poking you or crying or throwing things, just standing there patiently waiting for you to wake up so he can say “Hi mommy” you know he has normal sleep.
- Go to www.vitamindcouncil.org to see all the epidemiologic and scientific articles linking asthma, allergies, autism and ADD in children to low vitamin D.

Who has a sleep disorder in my practice?

- In the 1990's the sleep experts began to publish "Every American with hypertension has a sleep disorder in the background".
- Why are we still giving antihypertensive meds instead of fixing the sleep?
- Because the sleep study comes back to your office saying "no significant apnea".
- Early on, all they have is decreased REM, and then all you have to use is an antihypertensive.
- Yet we know that CPAP devices help hypertension.
- What if we could fix the sleep instead, at the beginning?

What is hypertension? Is it really what is hurting people?

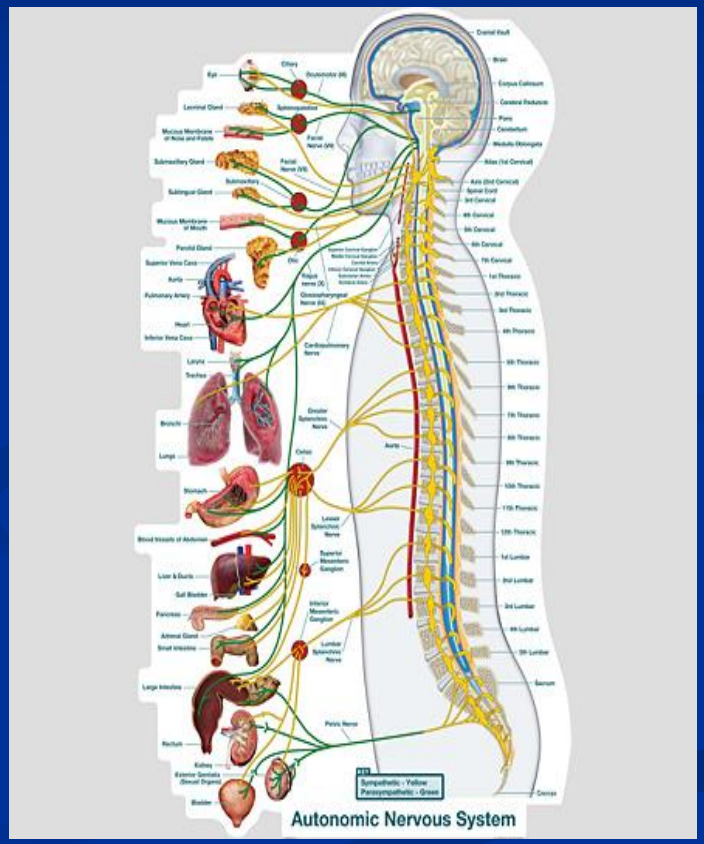
- Why do we think of *hypertension* as a "disease" and orthostatic *hypotension* is an "autonomic disorder"?
- Why isn't *hypertension* an "*autonomic disorder*" too?
- In the 1930's- 1960's the doctor stands at the bedside watching his patient dying of a heart attack and says to himself. "This is so horrible, how can I prevent this?"
- He thinks "What else is always hanging around when the heart attack comes?
- He sees high blood pressure, high cholesterol, diabetes.
- He thinks "Maybe if I fix those things the heart attacks won't come?"

Did we miss something?

- What did he miss, what did we miss?
- All of the patients with high blood pressure, diabetes and high cholesterol have a sleep disorder in the background causing those disorders.
- We just spent 50 years making hundreds of medicines for hypertension, diabetes, high cholesterol and missed the primary cause.
- The tragedy: The patients I see in the hospital with stroke are *on those medicines* but they just had a stroke anyway.
- We haven't fixed the sleep disorder and we have been so successfully trained to focus on the blood pressure that it doesn't occur to any of us to wonder if that is really the cause.

Hypertension is an autonomic disorder

- *Hypertension* is an autonomic nervous system disorder just like orthostatic *hypotension*.
- The system that keeps our blood pressure normal is a nervous system that we learn about in medical and nursing school.
- It has receptors in veins, arteries, heart, and systems that cause veins to dilate, arteries to constrict, the heart to beat faster or slower. It is a very complicated system.
- All of the nerve cells that run this system repair and replenish their supplies only in sleep.
- Maintenance may occur while awake but repair and the creation of stores of supplies of aceylcholine, epinephrine, norepinephrine only happens in sleep.



Our drugs duplicate normal body chemicals

- Every drug that we make, that we're so proud of as physicians and scientists, duplicates a chemical that is in the body already.
- The success of that drug is tied to how well it duplicates what the original chemical was supposed to do.
- We don't understand *why* the original chemical is not doing it's job but we try to duplicate it.
- That is the state of all medical therapy at this time.
- Any disease that is not caused by infection or physical injury is a primary malfunction of a system that was functioning normally at one time.
- Sometimes it is a gene mutation that predisposes to a disease.
- If so, why is that genetic mutation, that's been there since birth, manifesting now, at age 15, at age 35, or 75?
- "We see this."

We sleep because we only make 16 hours worth of chemicals

- "Hypertension" is the autonomic nervous system not having enough of the neurotransmitters or effector chemicals to make the blood pressure normal.
- When your patient sleeps normally they make enough of those chemicals to last 16 hours.
- If they don't make enough because their deep sleep is shortened you help them out by giving them the "fake out chemicals"
- What if they could make their own chemicals again in the right amount in the right place? What would that look like?
- That is why the CPAP device allows your patient to come off half of their blood pressure meds and their diabetes gets better.
- They are making their own insulin packets in the pancreas while they're sleeping.
- Every organ in the body is repairing itself and making the chemicals it needs to do its job the next day.

Is diabetes linked to abnormal sleep too?

- Diabetes is a disorder of not making enough insulin packets to last through the day, or not releasing them in the right number at the right time.
- Diabetes can also be a faulty glucose receptor. Glucose receptors on the cell membrane have to be made, recycled and repaired, that happens in sleep.
- Diabetes can be an autoimmune related death of islet cells.
- If there are stem cells in the pancreas that can be teased out and made to form islet cells doesn't that imply that our body is designed to be able to do just that?
- If the autoimmune disease continues unabated and the state (deep sleep) that induces growth and repair doesn't ever happen then the stem cells never get a chance to show us what they can do.

Is diabetes linked to abnormal sleep?

- There are thousands of published genetic causes for diabetes.
- Each of them affects the islet cell's ability to start the day with functioning mitochondria, endoplasmic reticulum, packets of insulin, enough of the raw materials to make the ATP to have the cell function normally all 16 hours.
- This is how the CPAP mask allows your patient to come off the diabetes medications.
- Could high cholesterol be linked as well? I think it is.

Is high cholesterol linked to abnormal sleep?

- When we don't sleep the entire endocrine system goes haywire.
- Cortisol is not made properly, testosterone and estrogen and progesterone and growth hormone and cholesterol (which can be thought of in some circumstances as being in the endocrine system) are all made either too much of or too little of.
- We know the men with OSA have low testosterone, they frequently also have hypertension and diabetes and abnormal leptin and ghrelin levels.
- The entire endocrine system designed to accomplish normal homeostasis is altered.
- Just as not enough deep sleep leads to *hypertension* I believe it also leads to *high cholesterol*.

Could we treat the sleep instead of the hypertension?

- This implies that the doctor in the 1930's who noticed that hypertension, diabetes and high cholesterol were all hanging around by the time the heart attack came was right, but
- Those three coexisting factors could be treated more effectively by improving the sleep and we might gain improvement in pain depression, memory, balance, and many other diseases.
- It's important to understand the time frame of this sort of repair.
- We're accustomed to giving a drug and wanting an immediate response, that is not the way sleep works, it is time dependent.

Could we treat the sleep instead?

- If the sleep has been abnormal for a long time the body does not heal over night.
- Each night there are only a few minutes of time dedicated to healing each of the body systems that must be repaired.
- Ten to forty years of poor repair takes many months to fix.
- In the mean time we have good ways of sensing how things are going, we measure the blood pressure, the blood sugar and the cholesterol and watch for them to improve.
- Then we can remove the medication that the patient needed in the past but doesn't need now, if the sleep goes bad again the hypertension will come back, the D level must be tightly controlled for the sleep to completely normalize.

Why CPAP is not really enough

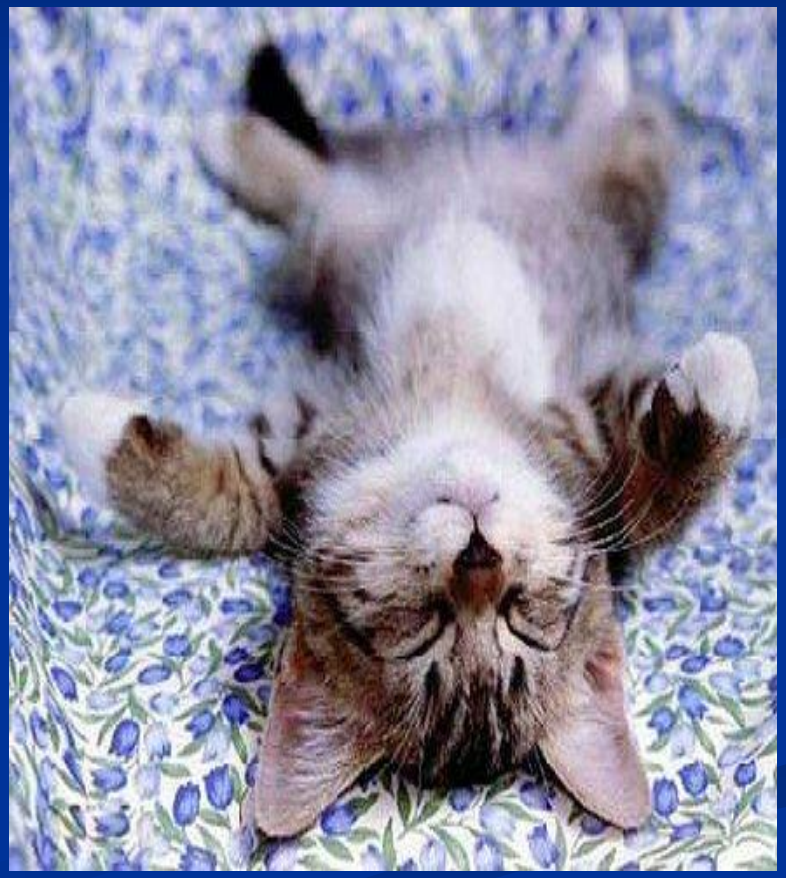
- CPAP is wonderful but if the underlying cause is not treated then the abnormal paralysis in sleep continues to worsen.
- As the pressure requirements go up we have to increase the pressure settings and move to BiPAP.
- Eventually the mask will blow right off the face, and your patient has moved to sleeping in a chair because even with BiPAP the airway is collapsing as they get too paralyzed in REM.
- Once discovering vitamin D receptors in the brainstem nuclei that make us properly paralyzed in sleep I believe that continuing, untreated D deficiency is making this worse in the background, and we can therefore make it better.

What should I do for my patients?

- Can vitamin D cure my patients' diseases?
- No, but normal sleep can.
- Does every one of my patients need a sleep study? No.
- Ask the questions, look at the documented diseases.
- Learn how to get the sleep normal by treating the deficiency states and using the sleep meds.
- If all else fails then a sleep study and CPAP.
- Make sure your patient is sleeping before they do the sleep study. If they're awake we don't learn much

Restorative sleep is the cure

- The cure is the sleep, not the vitamin D.
- CPAP is one way, D another.
- If it's a deficiency state why not try to treat that first?
- The curative effect is not just D, it's a perfect D level sustained over months
- There are secondary B deficiencies that also have to be fixed in patients who have been D deficient > 10 years for the sleep to normalize.



D level over 80 ng/ml and D2 can make sleep abnormal too!

- 60-80 ng/ml appears to be the D blood level for normal, restorative sleep.
- Normal sleep, night after night, is what cures the body.
- Presumably people who live outside get to 80 in November and fall by 10 pts every 2 months during the winter to 50 in March or April.
- Year after year of lower than 50 appears to bring on the sleep disorder.
- Vitamin D2 is what rats use because they're nocturnal, it is not what humans use.
- D2 does not help sleep and appears to worsen it.

Vitamin D is a hormone therefore has a “level”

- All of the “toxicity” refers to hypercalcemia but most of my patients had “toxicity” symptoms way before the calcium went up.
- Symptoms of fatigue, pain and poor sleep start to return at a level of 80, so do the diabetes and hypertension.
- The abnormal movements in sleep come back leading to pain on awakening again.
- THE SLEEP DISORDER COMES BACK with a too high D just like too low D.
- As with every hormone: too high things go wrong, too low things go wrong.

Vitamin D Toxicity and why the FDA's not crazy

- Because this is over the counter FDA has recommended a dose of 1000 IU/day.
- They hope it is a dose that won't hurt anyone, especially since no one is measuring their levels appropriately.
- But it is not necessarily the dose that you or your patients need.
- What you would think if your patient on thyroid supplement came back with multiple complaints and hadn't measured her thyroid levels in 7-8 years?
- This will help your patients but you must measure it frequently just as you would thyroid.

Vitamin D Toxicity and why the FDA's not crazy

- This is not only a hormone, it is a hormone with a narrow band of normal.
- It changes in each person from month to month and year to year based on sun exposure and skin type.
- How could the FDA possibly recommend a single dose for all Americans living from Florida to Alaska with very divergent skin colors and lifestyles without screwing everyone up?
- They wisely chose to recommend a tiny, tiny dose.

What's the right dose?

- We make 20,000 IU of vitamin D on our skin in 1-6 hours in a bathing suit, middle of the day middle of the summer.
- Time needed to accomplish this is related to skin color.
- 1,000 IU/day is clearly not going to replace this.
- There are two types of doses :
  1) Repleating dose (going from 15 ng/ml to 65 ng/ml) and
  2) Maintenance dose (staying at 65ng/ml)
- The one time dose to go from 18 to 60 is much higher than the maintenance dose.
- Repleating dose is 10-20K/day for 4-6 weeks depending on the first measured level and, what month it's measured in, and how long it's been that low.

The daily dose is different for each of us. The healthy level same for everyone

- Usually in winter 5000-10,000 IU is the maintenance dose once the level is 60-80.
- BE CAREFUL that about 2 people out of 100 only need 1-2,000 IU/day.
- The level they walk in with is related to how sick they are but not always related to the dose they will need.
- Do a level, start a dose, and measure the level again in a month, no longer.
- Did it go up, did it go down, did it stay the same?"

Dosing vitamin D

- Summer dose is zero to 10,000 and different for each person based on where they live, how much they go outside and how fast they make it, ie skin color.
- Dark skinned people make it slower, they are made for very high sun environment and use melanin in their skin to block D formation so they don't get too high.
- We know that darker skinned people have more sleep disorders, this is why.
- Each person needs to learn their own winter dose and summer dose that keeps them 60-80 ng/ml.

Dosing vitamin D

- Surprisingly, once my patients wake up strong, happy and pain free for several months they can often tell by the way they feel that their level isn't right.
- When they feel worse they decrease or increase by half of their dose.
- If, within a day or so, they're feeling good again it usually means they went the right way.
- Always insist on numbers to support these moves in the first to second year. After that they may not need to be done as often.
- All insurances will do four vitamin D levels per year with the ICD 9 of 268.9; vitamin D deficiency. All of your patients make that diagnosis so don't be afraid to use it.

The amount of D made per hour of sun exposure decreases each decade of life

- Decreasing vitamin D and the resulting sleep disorder plays a large role in senescence and death for all of us.
- Despite the fact that we do store this chemical the body does not make 50,000 IU in a day.
- For normal sleep, dosing once a week, or a month, does not appear to be the same as daily dosing.
- If you are using this to make normal sleep it's best to duplicate what happens in normal biology.
- It is very helpful to ask your patient to keep a record of their levels and the doses they took in relation to the time of year.

Other vitamin deficiencies that affect sleep may develop after long periods of D deficiency

- D hormone has other cofactors that are necessary for its action in each cell, so I always give a multivitamin.
- B12 helps the sleep and should be >500. If it's below 500 I supplement with 1000 mcg per day for several years.
- D has receptors in the parietal cells of the stomach that make acid and intrinsic factor so B12 deficiency is usually a secondary deficiency to D deficiency and what we've been taught about "pernicious anemia" is actually wrong, once you replace the D as well as the B12 the anemia usually corrects.
- Anemia of "chronic disease" always has a low D level in the background, and in my experience usually corrects with the proper vitamin D replacement, 60-80 ng/ml.
- All the cells of the bone marrow, including red cells and platelets have vitamin D receptors on their surface.

Now what do I do?

- Measure your patients' D levels regularly. Medicare pays for it 4 times per year (ICD 9: 268.9).
- The right test is D25OH. Don't test D1, 25 OH .
- Never use the 50,000 IU prescription D2 regardless of what is published about it
- Start your patient on whatever dose you feel comfortable with and measure it again in 1 month, you'll be surprised at the dose you'll need learn it yourself if you feel more comfortable with that.
- Get the level to 60-80 ng/ml. Sleep does not get better until then.
- Check the D level often in the first year like you would if you started someone on thyroid.
- The longer the patient has been sick the longer if will take to normalize the sleep, then to heal.

Getting the sleep switch to work properly

- While we sleep we also repair our sleep switch after 20 years of bad sleep it may be pretty rusty.
- Patients who do not sleep will get better faster if you “coax” the brain into sleep with a sleep medication.
- There are no good or bad sleep meds just the one that works for this patient.
- We’re really guessing which, of maybe 20 chemical levels, are not quite right during sleep and trying to mimic it with our pill.
- You may have to try several sleeping agents, sleeping pills are not inherently dangerous if you are treating the sleep disorder in the background, eventually your patient should be able to come off the sleeping medication and sleep without it.

Vitamin D side effects

- Leg cramps or worsening headaches may suggest magnesium is low, give sunflower or pumpkin seeds as a magnesium source daily or take magnesium gluconate 500 mg/day. (not oxide) send them to www.vitamindcouncil.org. for any questions.
- If D causes diarrhea (1/50 of my patients) put the D on the skin instead of orally for a while or try the powdered form instead of D dissolved in oil. Or carefully use a tanning bed.
- Be careful of giving supplemental D to people who are not sick. They may not need it and if it gets too high it will goof up their sleep.
- If they feel worse immediately lower the dose.

Are there other medicines that prevent REM sleep?

- Clonidine prevents REM sleep.
- Beta blockers prevent REM sleep.
- Long acting narcotics prevent REM sleep.
- Serotonin reuptake inhibitors (SSRI antidepressants) prevent REM sleep.
- Dopaminergic blockers (antipsychotics) prevent normal sleep because dopamine helps run the paralysis and timing of sleep.

The sleep is the important thing

- Try to get the D right, but while you're doing that:
- Whatever helps your patient's sleep will make him better, faster.
- Crummy, abnormal, drug induced sleep is better than no sleep.
- Don't be afraid of sleep medications.
- If you have sleep apnea and can wear the CPAP mask you'll get better faster help them sleep better so they can wear it.
- Change all SSRI's to morning.
- Use SNRI's if possible, they are shorter acting and affect REM less.
- Move the beta blockers or clonidine to morning, don't use the clonidine patch.
- Try not to use anti psychotics at bedtime.

Vitamin D levels are affordable

- Patients without insurance : DRL charges $64.00 cash for a vitamin D level.
- www.vitamindcouncil.org will do your D level for about $70.00/level. They send a filter paper you put drops of blood on it they send you back the level.

In the third year of giving lots of patients vitamin D some questions remain

- Why are some of my daily headache sufferers developing burning in their hands and feet?
- Why don't all of the patients who came to see me for burning in the hands and feet get completely better with D?
- Why do some vitamin D deficient patients have pain and some do not?
- Why are some people cured of pain using D and some not?
- Why haven't the irritable bowel symptoms gone away even though the reflux has?
- Why aren't my patients losing weight at the rate that they gained it when they became D deficient?
- Why are some of my patients *still* not sleeping normally with everything I know of in range?
- What is it that their brain still wants to sleep normally?

Pantothenic acid (B5)

- In July one of my patients brought me a book on using pantothenic acid to cure rheumatoid arthritis. (Why on earth do all of my patients think I'm interested in vitamins?)
- Because I'm really not that interested in vitamins, of course I didn't read it, until she was coming back in follow up 2 months later.
- It turns out that pantothenic acid deficiency causes "I can't sleep" "my belly feels bloated", "my hands and feet burn" and "my balance is bad". (which is why my patient brought me the book)

Pantothenic acid is made by the intestinal bacteria

- I hate taking vitamins and I eat a good diet and can't picture why I'd be B vitamin deficient, so all I've been giving is MVI and B12 if it's low, iron if it's low.
- Could some of my patients have new burning in their hands and feet because I've not been supplementing B complex?
- Turns out that 7/8 B's are made by our poop bacteria, all except niacin. We don't know how big a role this plays in our supply, and that is very difficult to measure. BUT…

Why do all of these people have "abnormal colonic microbiomes"?

- Hypertension
- Heart disease
- High cholesterol
- Obesity
- Stroke
- (All who we know have sleep apnea and low D)
- Multiple Sclerosis
- Rheumatoid arthritis
- Psoriasis
- Ulcerative colitis, crohn's
- Lupus
- Autoimmune diseases of almost any kind

Do people with sleep apnea have abnormal poop too?

- There is a connection between the human intestinal microbiome and the vitamin D supply.
- Once made, D goes to the bile then the colon where it supplies our poop bacteria with the D they need.
- It appears that low D over long periods may result in changes in the population of intestinal bacteria.
- Those bacteria are commensal organisms that use our D and in return secrete B's into our gut that we absorb.
- That means that some of these B's might go low despite a good diet, in a pattern that we wouldn't expect.

How to get the right microbiome

- If the D is the major problem how come replacing it for three years didn't fix the irritable bowel?
- Does this explain why some D deficient people have arthritis and terrible pain and some do not?
- Pantothenic acid becomes Coenzyme A which is responsible for making cortisol, linking it to arthritis pain and autoimmune disorders.
- Could this explain the "adrenal fatigue" my patients mumble about that never made any sense to me?

Lets coax the happy bacteria back

- Do we really need to eat poop, probiotic bacteria, to get these guys back? (Humans don't usually eat poop.)
- If abnormal colonic biomes are related to weight gain and foul smelling farts I want my guys back in line again.
- If those bacteria are not making those B's to make us happy then they're making them because they can, and
- They may need them in larger supply to grow back.
- It appears that getting the four normal species back may need both plenty of B's and D in good supply.

Use Caution with big B vitamin doses

- Even though they're water soluble the B vitamins may not be as benign as we've been told.
- High doses of pantothenic acid seem to make some of the patients,(who I presume are not deficient), agitated and make their sleep worse the day they start it.
- Biotin and panthothenic acid are transported by the same pump so high biotin doses force the pantothenic acid down producing abnormal sleep.
- Once the poop bacteria are back we'll have two sources, what happens then?

How to recover our “happy” poop bacteria?

- It appears that at about the 3rd month the poop bacteria are back and now we’re absorbing both the gut production and the pill supply.
- Several patients who had been on D for 3 years have reported that their sleep improved, and their pain resolved, immediately, 2 days after starting B 50.
- In about 3 months the pain returned and the sleep got goofed up again and stopping the B 50 caused it to normalized again.
- I think most types of pain are still related more to abnormal sleep.

Happy poop bacteria

- I am now starting B 50, for only 3 months, with D replacement in anyone with:
  - Burning in the hands and feet or just burning in the feet
  - Prominent arthritis or chronic pain
  - Irritable bowel symptoms
  - B12 or iron deficiency or anemia
  - It's true that neuropathy patients may have diabetes but it turns out that the burning goes away pretty fast in most of them suggesting that diabetes is not the cause of the burning.
  - In the sicker patients with lots of symptoms I'll start the B 50 a month later so we don't get confused by the multiple symptoms.

How to recover our “happy” poop bacteria?

- Use either B 50; (all 8 B vitamins, 50 mg each) or
- B complex that has all 8 B’s and 50 mg of pantothenic acid.
- All B complexes are different, they have to read the label.
- MVI’s usually have 5 mg of pantothenic acid, which does not appear to be enough to fix things.
- It may be dangerous to replace just D and B 12 in the really sick people, a couple of years later they may manifest new symptoms that are related to B deficiencies related to lack of correcting the intestinal supply of B’s.

It's better to never have abnormal poop

- People who are not as sick and have not been D low for as long probably do not need this additional help.
- Pantothenic acid blood levels are not available commercially, apparently because the deficiency does not exist, (theoretically anyway).
- Since I'm giving all 8 B's I'm not really sure that it's the pantothenic acid that is to blame, the other B's are probably a bit low also.
- This is very preliminary but it seems to be working, several of my patients with refractory sleep disorders have gotten better with this one last thing added.

Could B vitamin deficiencies be more common than we've realized?

- This might suggest that one change, staying indoors, might result in a multiple deficiency state.
- Just D deficiency in some.
- D plus multiple B deficiencies in others who have had it longer, or after several closely spaced pregnancies.
- In my experience B 12 deficiency (<500) accompanies D deficiency in about 1/3 of the really sick ones.

Could B vitamin deficiencies be more common than we've realized?

- Could beriberi: weight loss, emotional disturbances, weakness and pain in the limbs, periods of irregular heartbeat, foot edema, heart failure, be presenting in patient populations where we don't expect it or think of it? Even in people with excellent diets?
- It might be pretty easy to fix if we think about it, even though I'm not really that interested in vitamins.

Our healthy vitamin D future