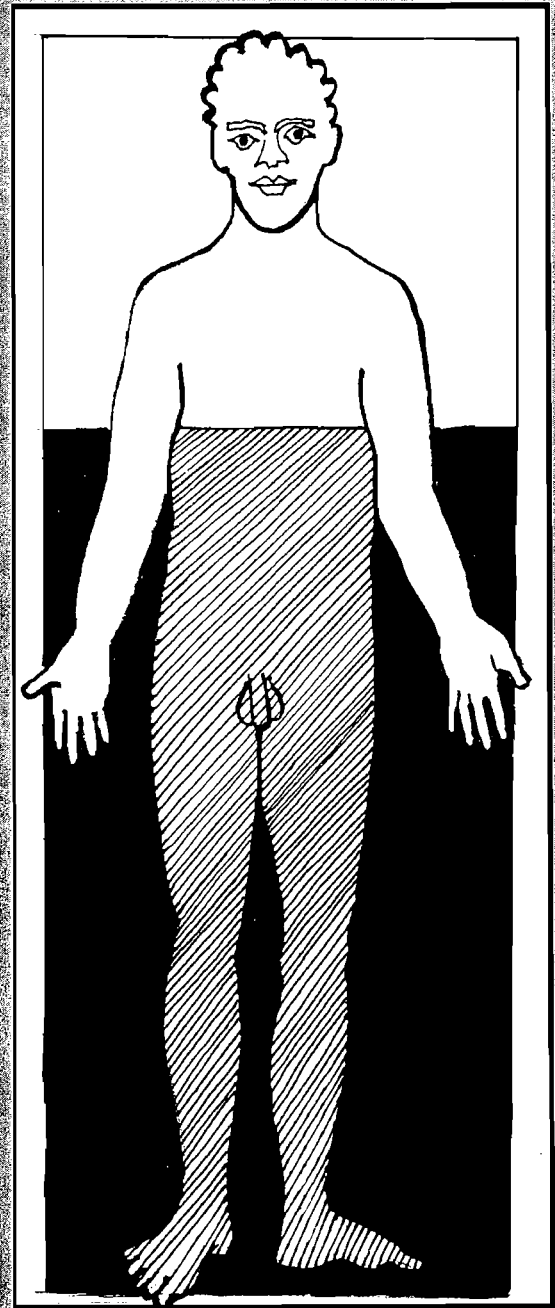
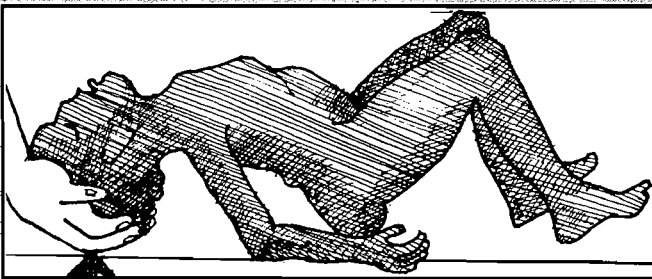


# Where There is No Neurologist



A manual for paramedical professionals in developing  
countries

Gretchen L. Birbeck MD, MPH

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Any errors or omissions are my own. Comments and suggestions, particularly those that may help to improve later versions of this manual, are very welcome.

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## How to use this manual

The TABLE OF CONTENTS lists everything in this manual. The TABLE OF CONTENTS is an easy place to look when you are trying to find a particular topic in the manual. You should probably start by reading the TABLE OF CONTENTS.

All the CHAPTERS are named by neurologic complaints patients give when they come to see you. For example, there is a chapter on “BURNING OR NUMB FEET.” There is also a special section (the blue section) on THE NEUROLOGIC EXAMINATION. Examining the nervous system will help you to *diagnose* the patient’s problem. It is like listening to the lungs of a patient with a cough.

The DRUG DIRECTORY (in green) is at the end of the book. It describes how to safely use all of the medicines described in this manual for the treatment of neurologic problems. Many drugs have more than one name. We have tried to list all the different names for each medicine, but you may get a brand name for a drug that is different than the name listed in the DRUG DIRECTORY. If you know the name of the drug you get, try to write it in the space provided. A doctor or pharmacist may be able to help you find out the generic (non-brand) names for the drugs in your hospital or clinic.

The GLOSSARY (in the yellow section) lists some of the more difficult word used in the manual. Big words are not always better and can sometimes be confusing, but certain words have special meaning and are important for you to know. If a word is listed in the GLOSSARY, it will appear *in italics like this*. If a word appears in italics and you do not know what the word means, you can look it up in the GLOSSARY by looking under the first letter of the word you do not know. Th GLOSSARY words are listed *alphabetically* (see, you can look one up already!).

Often in medicine we shorten names or abbreviate them. For example, you probably don’t write “tuberculosis” in notes, you probably write “TB”. All the ABBREVIATIONS used in this manual are listed *alphabetically* at the end of the manual in the pink section.

Throughout this manual, some sections are specially marked with different symbols.



**When you see these hands, pay special attention. Key points in neurologic care are being made.**



**When you see this pencil, you are being reminded about something that should be written in the patient’s medical record.**

Ideally, you should try to read all of this book at least once. Then, when someone comes in with a complaint that you believe is from a *nervous system* problem, you can just peek in the book (probably first looking at the TABLE OF CONTENTS) to remind yourself what to do. After you have used this book for many patients with neurologic problems, you may find that you hardly need the book at all! Unfortunately, you may not have enough time to read the whole book at once. If you do not have the time to read the whole book all at once, think about reading one chapter a week. Choose chapters that list a complaint you see a lot. For example, many Maternal and Child Health workers take care of children who have *seizures* (fits) during high fevers. If you see many children with this problem, then CHAPTER #1-FITS FAINTS, SPELLS AND CONVULSIONS would be a good chapter to read first. Regardless of what sort of patients you see, read the blue section on THE NEUROLOGIC EXAMINATION. This section is referred to in most chapters.

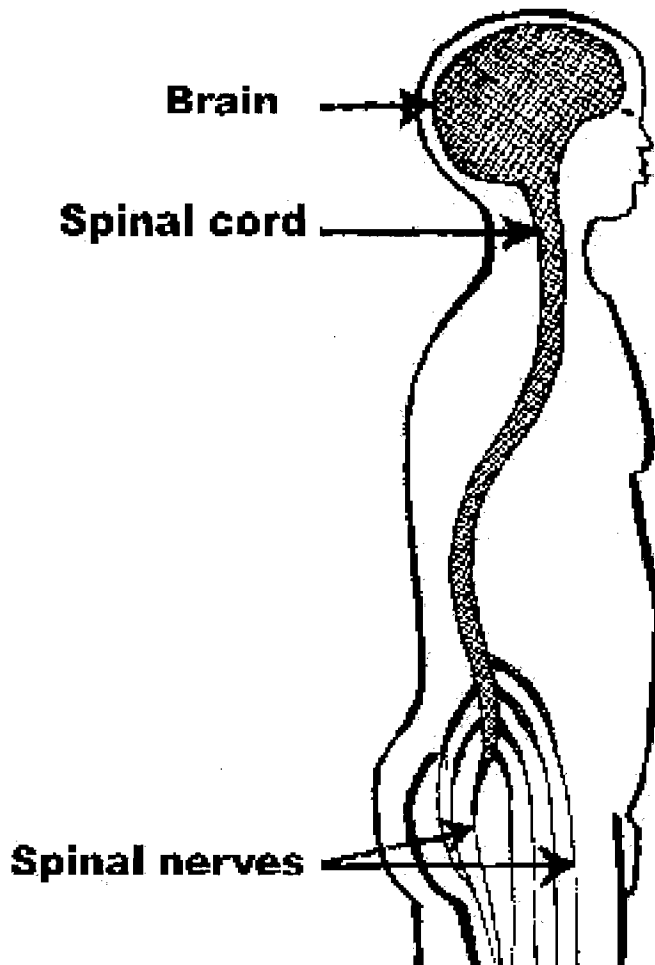
Consider keeping this manual available in your clinic or ward. When anyone sees a patient with a neurologic complaint, they can simply refer to the appropriate chapter for help. Each chapter has a one-page summary at the end. The “summery” offers a quick reminder on how to approach the neurologic problem discussed in that chapter. The manual will probably be more helpful if it is kept close to patients rather than in a distant library!

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## Introduction

A *neurologist* is a doctor with special training to take care of patients with problems related to the *nervous system*. *Neurology* is the study of the *nervous system*. The *nervous system* includes the brain, *spinal cord* and nerves. The brain is contained in the skull (your head). The *spinal cord* is in your back. Nerves travel from the brain and spinal cord to your face and body all the way to your big toe. Some people (even some doctors!) believe that patients with problems in the nervous system cannot be helped. **This is not true!** There are many common neurologic problems that you probably see every day that have very good treatments.



The brain is the information center that tells our bodies what to do. It holds our memories so we can learn. It lets us walk and talk and eat. When things go wrong with our brains, we can have pain, like headaches. But *nervous system* problems can cause strange problems, too. *Seizures* start in the brain and can look like fainting or fits. Bizarre behaviors, such as those seen in psychotic patients, can be related to brain problems. *Spinal cord* injuries cause *paresis* (weakness). Drugs, infections or poor nutrition can damage nerves and result in painful, burning feet or numbness. Leprosy is also a disease of the nerves.

Neurologic problems can often be treated with advice, a change in diet or medicines available at the local pharmacy. Some neurologic complaints are from serious health problems. Patients with serious neurologic problems need to be sent to a doctor for further help, if one is available.

This book will help you to-

1. Recognize (or *diagnose*) common problems of the *nervous system* in your patients
2. Treat many neurologic problems with advice or medicines available to you.
3. Recognize when neurologic problems need to be reviewed by a doctor.

People with problems affecting their *nervous system* need a great deal of help and support. Diseases of the *nervous system* may make people unable to work and can cause them many social problems. This manual is designed to help you help them. As a healthcare provider with special knowledge of neurologic diseases, you will be an even more valuable worker to your community. Other clinical officers and nurses may realize that you have a special interest in helping patients with neurologic problems. This is fine because if you see many patients with neurologic problems, you will get even better at caring for them. Sharing this manual and your knowledge with other clinical officers and nurses is another way to improve care for people with neurologic problems.

# The Neurologic Examination

Believe it or not, you probably already examine your patients' *nervous systems*. When you say "hello" to a patient, watch them walk into the room and listen to them speak, you are observing their *nervous system* at work. You may not complete the entire neurologic examination shown here on every patient you see. Within each chapter of this book, the parts of the examination that are most important to complete for each complaint are noted. The entire neurologic examination is described here, but you may end up doing only the most important parts of the examination for each patient based on their complaint.

One of the most valuable things you can provide as a nurse or clinical officer with special skills in neurology is to perform a good neurologic examination and history. When someone has a neurologic problem, their examination can change and your early observations are very important. Also, you cannot possibly remember exactly how every patient you see looked when you last saw them. Careful comments in their medical record from you will allow you to tell if their condition is improving, worsening, or staying the same. This can be important when determining whether or not to send a patient to a hospital for care by a doctor.



Remember to write down important things you notice when you examine the patient.

## Level-of-Consciousness

The first part of the neurologic examination is evaluating the patient's *level-of-consciousness*. There are many different ways to describe the level-of-consciousness.

Level-of-Consciousness	What the patient looks like
Normal	<u>Adults</u> -awake, alert, they know who they are, why they are seeing you and recognize family members. If they are sleeping, they should wake up quickly to your voice or a light touch and should not need to be awakened over and over again. <u>Children</u> -Awake, alert, looking around. If frightened, they may cling to their mother. If asleep, they should wake up fairly easily.
Lethargic	Sleepy requiring some effort to awaken them. If you leave them alone, they may drift back to sleep. They may be somewhat confused. <u>Children</u> can seem irritable and cry a lot when they are lethargic.
Obtunded	Deep sleep only awaking if they have pain induced by a vigorous shake or squeeze. Once the pain stops, they go back to sleep.
Coma	Deep sleep with little or no response to pain or voice.

When you tell someone else (perhaps another clinical officer or doctor) about a patient's *level-of-consciousness*, you should describe the patient and not just use a single word like "coma". Patients may be lethargic from a medication, especially narcotic pain medicines. Patients may even seem a little lethargic if they are very tired and have not slept for some time. Obtunded patients and patients with coma are usually extremely ill and need emergent care. You have probably seen people with cerebral malaria who are in coma or obtunded.

One way to assign the level-of-consciousness a number value is the Glasgow Coma Score (GCS). The GCS can be a very useful way to quickly communicate the patient's condition, but the number alone is not



usually enough information, by itself, in the chart. Recording the GCS number AND a brief description of “what the patient looks like” is the best way to record their level-of-consciousness.

Glasgow Coma Score	
Best motor	1=no movement; limbs remain flaccid even with painful stimuli 2=forearm move outward 3=forearms move inward 4=limb withdraws from pain 5=localizes and tries to remove painful stimuli 6=follows simple commands
Best eye	1=no opening even to pain 2=open with pain 3=opens to speech 4=spontaneous opening
Best Verbal	1=no sounds of any kind made 2=moans or groans but no speech 3=intelligible words but no sustained sentences 4=conversant but confused 5=oriented and conversant

$$\text{Glasgow coma scale} = (\text{best motor}) + (\text{best verbal}) + (\text{best eye})$$

After noting the *level-of-consciousness*, pay attention to how the patient looks and speaks. Is their speech clear? Do they make sense? Note any problems with speech. If a patient can swallow and smile normally, but they cannot speak or their speech is very slow, they may have *aphasia*. If a patient cannot move their mouth and their speech is difficult, they may have *dysphasia*.

Also note any strange movements. Do they twitch? Do they have a shake or tremor? These are important things to consider and will be discussed in later chapters.

One problem with the Glasgow Coma Scale is that infants and young children would not speak sentences even if they were completely well. For children with malaria, the best scale to use is the Blantyre Coma Scale.






### Blantyre Coma Scale for Young Children

Response	Findings	Score
Best Motor	Localizes painful stimuli	2
	Withdraws limb from painful stimuli	1
	No response or inappropriate response	0
Best Verbal	Cries appropriately with painful stimuli, or, if verbal, speaks	2
	Moan or abnormal cry with painful stimuli	1
	No vocal response to painful stimuli	0
Eye Movement	Watches or follows	1
	Fails to watch or follow	0

$$\text{Blantyre coma scale} = (\text{best motor response score}) + (\text{best verbal response score}) + (\text{eye movement score})$$

## Cranial Nerves

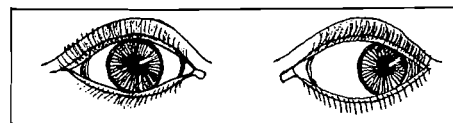
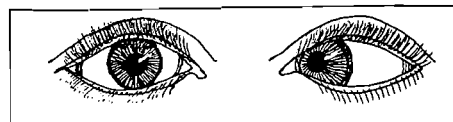
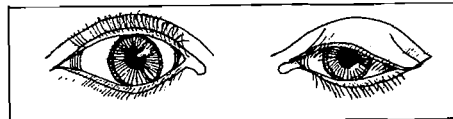
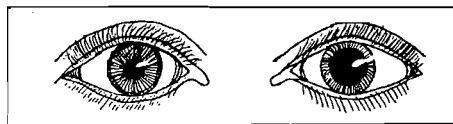
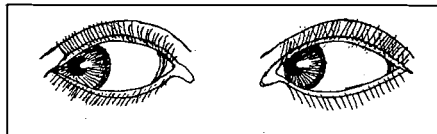
*Cranial nerves* are the nerves from the brain to the head, face, and neck. There are 12 cranial nerves. Sometimes only one nerve has a problem. Sometimes many *cranial nerves* are diseased or injured at the same time. *Cranial nerve* problems often cause abnormalities on only half the head or face!

Cranial Nerve-	How to test the nerve-	If the nerve is diseased or damaged-
1 (one)-to the nose Olfactory Nerve	Can the patient smell strong herbs?	Patient cannot smell anything and may not be able to taste food very well.
2 (two)-to the eyes <sup>3</sup> Optic Nerve	Can the patient count your fingers and tell you how many you are showing?	Patient loses sight in one or both eyes with no cataracts or injury.
3 (three), 4 (four), and 6 (six)- to the muscles that move the eyes, the eyelids and the <i>pupils</i>  3-Oculomotor nerve 4-Trochlear Nerve 6-Abducens Nerve  3, 4, 6 (continue)	Can the patient open their eyes, look up and down and to each side? Do they complain of seeing double? Are the <i>pupils</i> the same size? They should be. Shine a light in the patient's eye and their pupils should get small. In a dark room, their pupils should be larger.	Patients may have a droopy eyelid or a very large pupil that does not get smaller even when you shine light on the eye. If one pupil is bigger than the other, one of the eyes may have an injured nerve. Patients may complain of double vision.   If the double vision is from a cranial nerve problem, it will get better when you cover one eye!!    Sometimes you may see that one eye is not moving very well. This can be a cranial nerve problem too.
5 (five)-to the face to feel  5-Trigeminal Nerve	Touch the patient's face lightly with soft cloth on each side. Can they feel the soft touch on both sides?	Patients may have numbness on one side of the face, maybe only in one small area. Sometimes people can get terrible pains in the face without any other problem.
7 (seven)-to the face to move    7-Facial Nerve	Ask the patient to close their eyes. Ask them to smile. Ask them to raise their eyebrows as though they are surprised.	The patient may have a weak face on one side that looks very droopy. They may not be able to smile on one side or close one eye. They may have saliva (spit) dripping out of their mouth.   The eyebrows on the same side as the weak face will also be weak if this is a cranial nerve problem.  
8 (eight)-Vestibulo-cochlear nerve	Check the patient's hearing and balance	CN8 injuries are not likely to cause hearing problems since we have dual innervation (two ears!), but acute CN8 injuries may often manifest with severe nausea, vomiting and vertigo (dizziness with a spinning sensation).

<sup>3</sup> If there is an eye doctor/ophthalmologist available, they may be able to use their equipment to look into the patient's eyes and actually see cranial nerve 2!

Cranial Nerve-	How to test the nerve-	If the nerve is diseased or damaged-
9 (nine) and 10 (ten)-to the back of the mouth and throat  9-Glossopharyngeal nerve 10-Vagus nerve	Ask the patient to open their mouth and say "AAAHHH". Watch the <i>palate</i> . It should go up on both sides. If you have a tongue blade (no sharp edges!) or a cotton swab, you can lightly touch the back of the patient's throat by the palate. They should gag. Watch the patient take a sip of water.	The patients may choke when drinking water. Their palate may go up only on one side. They may not gag when you touch the back of their mouth.
11 (eleven)-to the shoulders  11-Accessory Nerve	Ask the patient to shrug their shoulders.	One shoulder may be too weak to shrug
12 (twelve)-to the tongue  12-Hypoglossal nerve	Ask the patient to open his mouth but keep the tongue inside. Examine the tongue while it sits quietly in the mouth. Ask the patient to stick out their tongue straight out.	The tongue may be weak and wasted on one side. When they try to stick out their tongue, it may go off to one side.

Problems with cranial nerves 3,4,and 6-



Problems with cranial nerves 7-



Problems with cranial nerve 12-



Because the cranial nerves travel together, they often get injured or diseased together. Cranial nerve problems may develop in children with TB that has traveled to the brain. If a child with TB has cranial nerve abnormalities, they need to be reviewed by a doctor.



If you think someone has a cranial nerve problem of any kind, it is very important to test all of their cranial nerves!!

## Strength Testing (*Motor Testing*)

Many people complain of weakness. Neurologic problems usually cause weakness only on one side of the body or in both legs. "All over body weakness" is hardly ever from a neurologic problem. "All over body weakness" can be caused by infections or depression. Most people with a fever feel weak. It is important to decide if someone has *focal* weakness. *Focal* weakness is weakness in one distinct part of the body rather than the whole body. There are special words for different types of weakness.

*Monoparesis* - This is weakness limited to a single arm or leg.

*Hemiparesis* - This is weakness on one side of the body so that the arm and leg on that side are both weak. Sometimes one side of the face can also be weak.

*Paraparesis* - This is weakness limited to the legs.

*Paresis*, *hemiparesis* and *paraparesis* are all signs of a neurologic problem and need to be closely examined.

*Paresis* refers to weakness but if someone is totally unable to move part of their body we call this *plegia*. When someone has *plegia*, they may have *hemiplegia* or *paraplegia*. Since complete loss of strength is rare, throughout this book we will refer to weakness as *paresis*. Just remember that complete *paresis* = *plegia*.

To test arm strength, you may ask someone to hold their arms straight out and see if either arm cannot be held out. The best test for leg strength is to ask someone to walk down the hall for you. Are they dragging one leg? When they walk, does one arm stay still at their side? If they can walk, ask them to stand up on their toes and back on their heels. Then ask them to do a deep squat. If someone can do all of these things, they are probably not very weak. Sometimes there is no weakness, but people have pain that prevents them from walking and squatting. In these people, it can be very difficult to test their strength.

If people complain of leg weakness, be sure and ask if they are having any trouble *urinating* or *defecating*. The nerves to the legs also control *urination* and *defecation*.

## Tone

Checking reflexes requires a reflex hammer, but you can check the tonicity of the patient simply by passively moving their arms and legs. For patients who are awake, try to get them to relax as much as possible. Check the tone of your colleagues and patients without neurological problems or complaints to get an idea of what is "normal". In acute injuries to the CNS, tone is often decreased. Chronic injuries or problems are more likely to be associated with increased tone in which the patient's muscles are more taut or tight than normal.

## Sensory Testing

Most people will tell you if they have numbness or pain, but if someone complains of weakness it is important to ask about numbness or pain. You can test sensation with a soft piece of cloth and a sharp stick. (Don't ever stick someone hard enough to cause bleeding!).

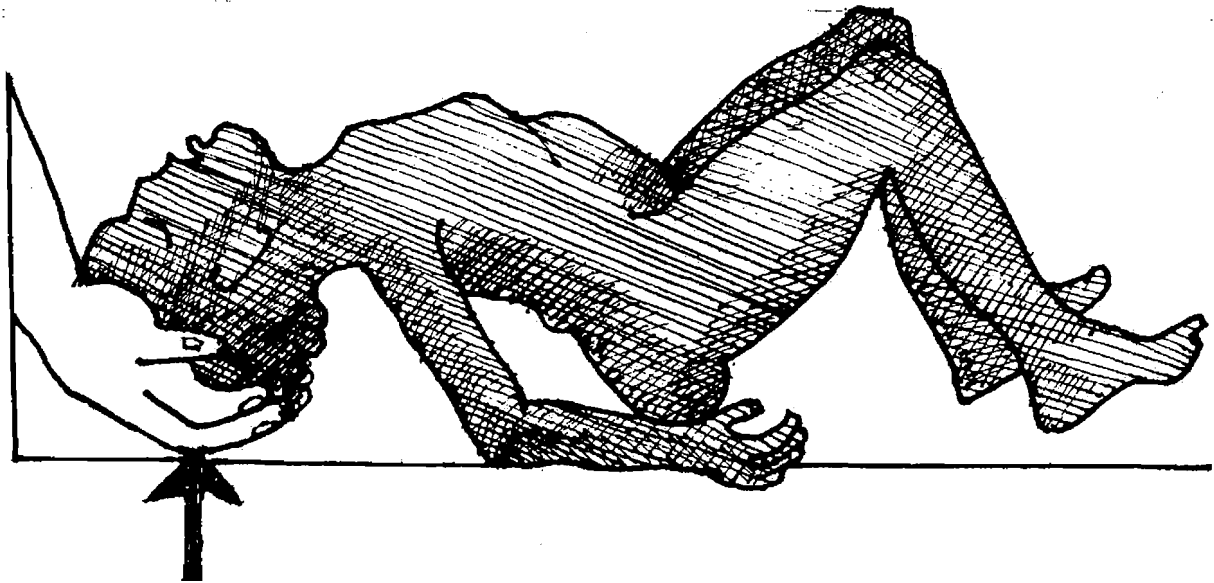
Many complicated things can be done to test the nervous system, but if you can do the neurologic examination described above, you have completed a reasonable examination. Many times you may not be certain if a patient has a neurologic problem. You can complete the examination and write down everything

you notice. Then examine the patient again in a week or two. Comparing the results of two examinations can be very helpful.



Appendix 1 shows you an example of a recording sheet for the neurologic examination that may be helpful. Use these sheets (make your own!) when you see a patient with neurologic problems.

## Brain Inflammation



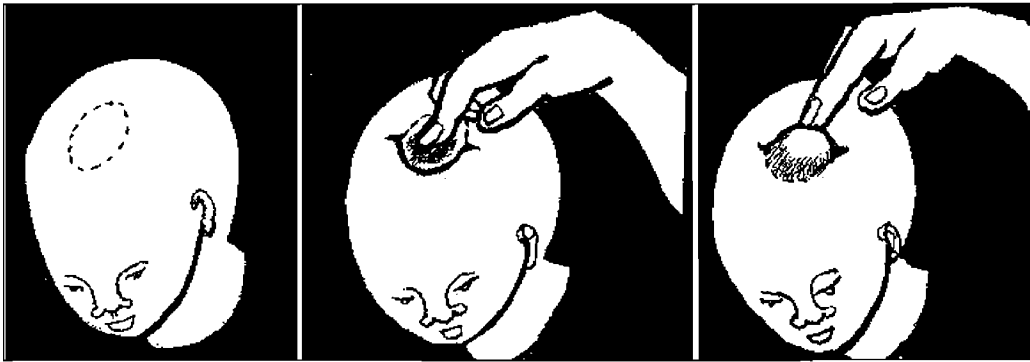
Finally, there are a few brief tests that look for very specific problems. One of the most important problems you want to be able to recognize is *meningismus*. *Meningismus* is neck stiffness and pain due to inflammation in the *meninges*. The *meninges* are the thick covering over the brain and spinal cord that lies between the brain and the skull. The *meninges* are important because they help to protect the brain from injury, but they can also get infected. When people have inflammation in the *meninges* we say they have “*meningitis*”.

To check for *meningismus*, you want to examine the patient lying down. Try to get them to relax and then gently flex their neck by putting their head forward to make their chin touch their chest. If people have *meningismus*, they will find this very painful. They may cry out or arch their back. Flexing the neck stretches the *meninges* and produces pain if the *meninges* are inflamed.

## Brain Swelling in Children

Brain swelling may be due to many different problems. In children less than 3 years old, the *fontanels* allow us to see if there is any swelling around the brain. The *fontanels* are small places in the infant’s head where the skull does not cover the brain. The largest *fontanel* is in the center of the front part of a child’s head.

Usually, the *fontanel* is almost smooth with the rest of the head, but if the child is very *dehydrated* (lacking fluid in the body), the *fontanel* may sink down leaving a dent in the head. If the child has brain swelling, the *fontanel* may be very full and can even bulge out. A bulging *fontanel* should be given careful attention. If it is usually an emergency.



NORMAL

SUNKEN  
(DEHYDRATION)

SWOLLEN  
(MENINGITIS)

You can examine infants to see if there is brain swelling!

## Chapter #1-Fits, Faints, Convulsions and Spells

### Case example

Stephen Mgandu is a 22-year-old man. His family brings him to clinic because of fainting spells (some family members call them “fits”). The spells have been occurring for almost five years and Stephen experiences about two a month. His family describes the spells as beginning with Stephen staring off into the distance, and then he makes chewing movements with his mouth. If the spells stop with the chewing movement, Stephen is confused for a few minutes afterwards. Sometimes the spells do not stop and he falls to the ground shaking, is unconscious afterwards for several minutes, and sleeps for almost an hour. When he falls to the ground, he often *urinates* on his clothing and bites his tongue. Once he even *defecated* on his clothing. This problem began five years ago shortly after Stephen had a head injury in a car accident. No one else in the family has “spells”. In between the spells, Stephen is fine. The spells worry Stephen’s wife. She is afraid she or the children may catch them. She is also scared because once Stephen fell forward almost into the fire. Stephen has no memory of the spells but knows that he sometimes wakes up in strange places with a sore tongue and a headache.

### Discussion

Stephen suffers from *epilepsy*. *Epilepsy* is when people have *recurrent seizures*. *Seizures* are a *loss-of-consciousness* due to *abnormal* brain activity. The initial problem likely started with a head injury during a car accident five years ago. Sometimes the brain is injured and develops a scar. This scar can cause seizures. Many people have *epilepsy* with no history of a head injury. There are good medicines for *epilepsy* **and epilepsy it is not contagious**. Patients with *epilepsy* may be treated very badly by others in their village. Sometimes even their own family members reject them. They need your help and support.

When children have *epilepsy*, their parents often remove them from school. In otherwise normal children with *epilepsy*, there is **no reason for the child to be removed from school**. Unfortunately, sometimes the teacher and school officials request that children with epilepsy be withdrawn from school. Children with epilepsy should be given the same chance to attend school as other children.

### Other Key Points

1. Family members often call *seizures* fits, faints, spells, or convulsions. Be careful when someone comes to the hospital after a faint that they did not really have a *seizure* instead since the two problems need different treatment.
2. Sometimes people with seizures know the spells are coming and can lie down somewhere safe to protect themselves from falling.
3. People with *seizures* may be very reluctant and embarrassed to admit their problem. Careful questions can help you determine if the patient has *seizures*.
4. If people have *recurrent* (more than one) seizures, we often call this *epilepsy*. Children who only have seizures with high fevers do not have epilepsy (SEE CHAPTER #2: FEBRILE SEIZURES).
5. Some patients do not stare or have chewing movements-they just fall to the ground and start to shake. The shaking can begin in a single limb or all over at once.
6. Many people with *seizures* take traditional medicines (especially bush teas) for their problem. It is important that the family understand NOT to put the bush teas or anything else in the person’s mouth while they are having a *seizure*.
7. Some people who drink too much beer (or other *alcoholic drinks* that cause drunkenness) have *seizures* because of the beer. Usually, the *seizures* happen a day or two after they stop drinking. It is important to ask if the person with spells is a heavy drinker.



## Questions to ask

1. Does the person have many spells?  
If there has only been one spell, it may not be a *seizure*. Even if it was a *seizure*, one may not need to be treated.
2. Did the spell happen when the person was hot, ill, weak or otherwise unwell?  
Was there is good reason for the person to faint—working in the hot fields all day without water is more likely to cause a faint than a seizures.
3. Is this a person who has had a head injury before? Have they ever suffered from a brain infection with cerebral malaria or *meningitis*?  
These people are more likely to have *epilepsy* (but most people with cerebral malaria or *meningitis* never get epilepsy).
4. Do the spells ALWAYS start with shaking in one arm or leg? Or confusion?
5. Is the person completely well when he or she is not having *seizures*? Are they suffering from weight loss? Headaches? Tuberculosis? Do they have HIV or AIDS?
6. Is this a pregnant woman? If so, **check her blood pressure**. She may have eclampsia.

## Examination

If someone is brought to you with seizures or fits and is still unconscious, seems very sick with a high fever or has more than one seizure and isn't waking up in between the seizures, they may have *status epilepticus*. GO TO CHAPTER #12: MANY SEIZURES to read about how to take care of these patients. *Status epilepticus* is a neurologic emergency!

If the person is awake and alert in the clinic, you should perform a complete neurologic examination. Can they walk normally? Is one side of their body weak? Are they numb anywhere? Examine their cranial nerves. If everything seems normal, then they probably have *epilepsy* and need medicines.

## Other Possible Problems

1. *Seizures* can also begin during pregnancy and may be due to *eclampsia*. If the person having the seizures is a pregnant woman, this is an emergency.



SEE CHAPTER #14: MANY SEIZURES



2. Fainting-Sometimes it is difficult to decide if someone had a seizure or simply fainted. Fainting usually occurs when someone has a weakened body from some other cause. Pregnant women can faint if they are very anemic.
3. *Febrile Seizures*-Children can have *seizures* with high fevers like the fevers that come with malaria. These children do not have *epilepsy* and will outgrow the seizures in time. They do not need *epilepsy* medicines. SEE CHAPTER #2: FEBRILE SEIZURES.
4. Pseudoseizures- These are events that may look like a seizure but in fact are hysterical spells purposefully “staged” by the patient, usually to get attention. Patients who have pseudoseizures always do so when there is an “audience” around to witness their performance. If no one is watching, the spell generally subsides. People who have pseudoseizures do not usually get injured during a fall, urinate on themselves or bite their tongues. It is important to recognize that people with seizures may also have pseudoseizures.

## Management

If the person you are caring for seems to have *epilepsy* (they have *recurrent seizures* for no clear reason) then they need medicines. It is important to make sure they are not having *seizures* from a serious condition such as *meningitis*. If the patient has *abnormal* findings on the examination, suffers from TB, has severe weight loss or nighttime fevers, or has daily severe headaches; you should refer them to the nearest doctor for review.

If the person is a heavy beer drinker, it is best to explain to them that their fits may be from the beer. They need to stop drinking beer to make the *seizures* go away.

If the patient has recurrent seizures but no abnormal findings on the examination, then treat them with PHENOBARBITONE. If the persons neurologic examination is abnormal after the seizure, it is particularly important to try and refer them to a doctor for further evaluation.

SEE THE DRUG DIRECTORY for instructions on how to administer PHENOBARBITONE.

Be sure to read the DRUG DIRECTORY for all the information on phenobarbitone.

Other drugs for seizures that you can use are-

PRIMIDONE  
CARBAMAZEPINE  
PHENYTOIN  
VALPROIC ACID

These are all discussed in the DRUG DIRECTORY too. PHENOBARBITONE is the cheapest drug and the easiest to buy. It also works well and only has to be taken once a day. PHENOBARBITONE should be the first drug you try unless the other antiepileptic drugs are readily available or the patient has a great deal of money and can buy other drugs. If a patient has a severe allergic reaction to PHENOBARBITONE, for example, they develop a severe rash or facial swelling when taking PHENOBARBITONE, then they cannot use PHENOBARBITONE or PRIMIDONE. Another drug must be used to treat their seizures.

## Guidelines for Follow-up

After someone starts taking PHENOBARBITONE, they may feel sleepy and tired for a few days, but this should get better. Start with the lowest dose recommended. See them again in one week. If they have another *seizure* before they have been taking the medicine two weeks, encourage them to continue taking it since the medicine may need time to take effect. If the patient has another seizure after taking PHENOBARBITONE for two weeks or more, increase the dose as described in the DRUG DIRECTORY.

If the person is very, very tired after taking phenobarbitone for one week, you may need to lower the dose. Also, if they start to appear drunk, are having trouble walking, or complain of feeling dizzy, the dose may need to be decreased.



Before making any changes in the dose, it is very important to confirm exactly how much medicine the person has actually been taking!

If the patient is having *seizures*, it may be because they are not taking the medicine you prescribed. Increasing the medicine will not help because they were not taking it anyway. Also, increasing the medicine may make them sick if they suddenly start taking it at the higher dose.

## Other Actions

Patients who have tuberculosis or HIV/AIDS may have *seizures* from a brain infection that needs treatment. These people need to be seen by a doctor. If it is not possible for them to see a doctor, you can begin treatment for *epilepsy*, but the problem (like a brain infection) will not go away. PHENOBARBITONE only treats the *seizures* and not the brain problem. If *seizures* are from a brain scar due to a head injury, then treat the seizures. The scars do not get worse. If the *seizures* are from an infection or tumor, the problem will get worse without more care. It is best to send them to the nearest clinic or hospital that has a doctor.

If the person with new *seizures* also complains of frequent headaches or visual loss or you find something *abnormal* on their examination, you may start them on PHENOBARBITONE, but also send them to a doctor for review.

## Patient Education

People with *epilepsy* often get severely injured when they fall into fires.



If someone comes to you with burns, consider asking them if they have fits or spells. Maybe they fell into the fire during a seizure.

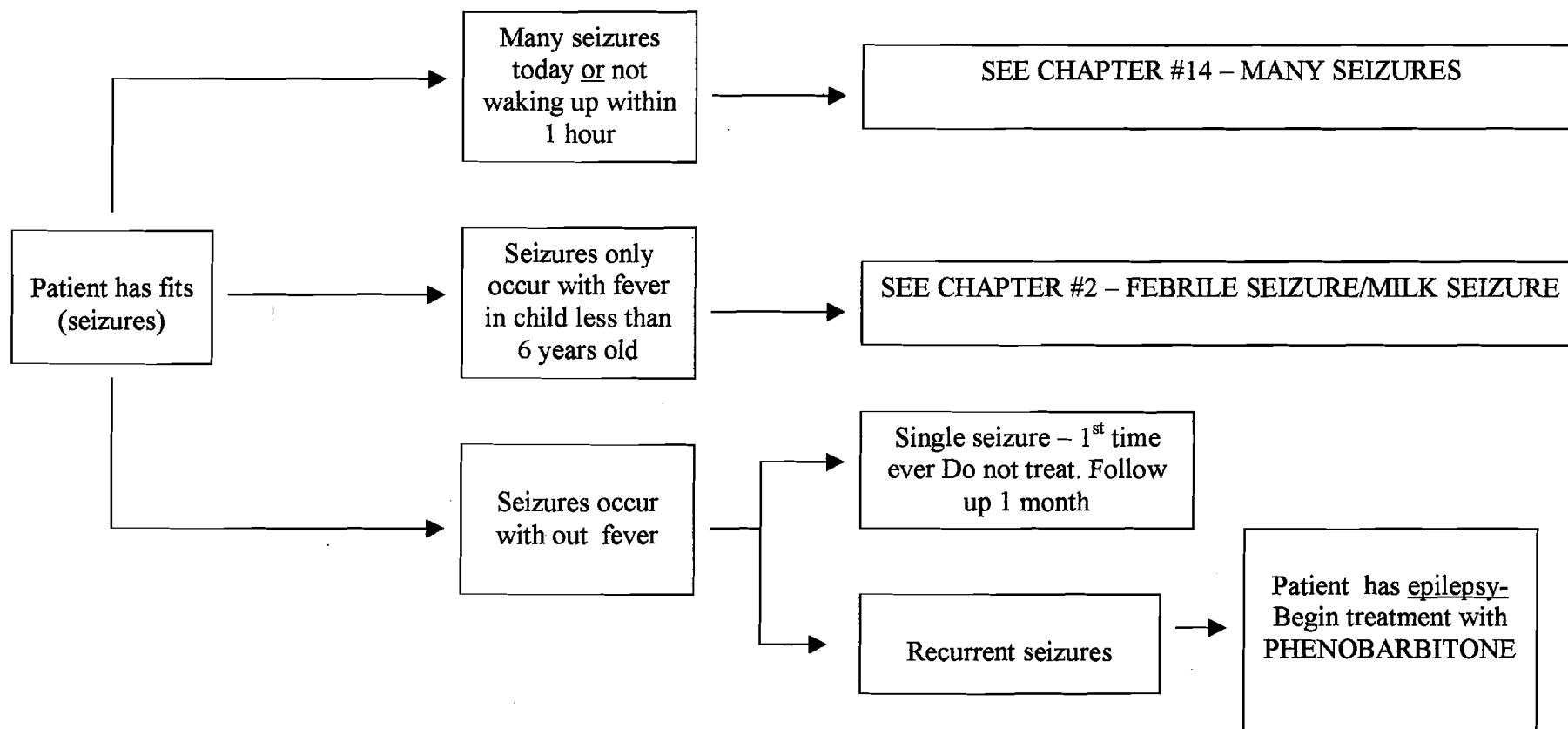
You should warn people with epilepsy to avoid working over open fires since they could have a seizure and fall in. Also, people with *epilepsy* should not drive vehicles or swim. Seizures can cause traffic accidents or drowning.

People with epilepsy should be advised to sleep regular hours and avoid beer (or other *alcohol*) since poor sleep and alcohol will make their seizures worse even if they are taking the right medicines. Recommend at least 8 hours of sleep each night.

Do not forget that family members need instructions on how to care for the person when they are having a seizure.

First, they should move anything dangerous (hot liquids, sharp objects) out of the person's way. **Epilepsy is not contagious so no one will "catch" seizures by helping!!** No one should place anything in the person's mouth during the seizure (no bush teas, no medicines). After the fit has stopped, place the patient on their side with the head sideways so any saliva or vomit comes out of the mouth and does not go back into the lungs. If the person has more than one seizure or is not waking up in the usual time (~30-60 minutes) the family needs to bring them to the clinic or hospital quickly for care.

**Summary: Fits, Faints, Convulsions and Spells**



## Chapter #2-Febrile Seizures

### Case Example

Bright Samu is a 3-year-old child brought to clinic for “fits and fever”. His mother reports that he has had body hotness for 2 days with some vomiting. This morning he was very hot and his mother saw him stiffen and shake all over. He slept for a bit after the spell. In clinic, he looks ill as he cries and clings to his mother. His temperature is 40 degrees Celsius. A thick blood smear for MPs are MPN 2.

### Discussion

*Febrile seizures*, also called “milk seizures”, are common in children who live in regions affected by malaria. Even in the United States (no malaria there!) children who get infections may have *seizures* when their body temperature gets very high.

*Febrile seizures* are from *abnormal* brain activity caused by very high body temperatures. *Febrile seizures* usually happen in children from 1 to 5 years old. In children less than one year, fevers and fits are more likely to be due to other problems. If a child’s first febrile seizure is after age 5, they need close observation to make certain that this is only a *febrile seizure* and not the development of *epilepsy*.

*Febrile seizures* are not the same as *epilepsy*. Children with *febrile seizures* will outgrow them (usually by age 6). *Febrile seizures* sometimes occur in several children from the same family.



Children with *febrile seizures* should recover shortly after the seizure. If they do not wake up or appear very sick, you must consider other problems. SEE CHAPTER #13-CEREBRAL MALARIA CHAPTER #14 MANY SEIZURES CHAPTER #6 HEADACHE (ACUTE). If the child has an underlying brain infection, then this is a symptomatic seizure, not a *febrile seizure*.

### Other Key Points

When you see a child with *seizures* and a high fever, you must not assume it is a *febrile seizure*. Children with simple *febrile seizures* usually have only one or two *seizures*. Although they have an illness (often malaria or a viral infection), after the *seizure* they wake up and are alert. If the child is not awake and alert within a few minutes after the *seizure*, you need to consider if they may have a more serious problem like *cerebral malaria* or *meningitis* (SEE CHAPTER #11-CEREBRAL MALARIA).

### Questions to Ask

1. How old is the child?

*Febrile seizures* usually occur between ages 1-5 years old. Although children under 1 may have *febrile seizures*, children this young are at greater risk of more dangerous conditions such as *cerebral malaria* or *meningitis*.

2. Has the child ever had a *seizure* before? If yes, did all the previous *seizures* occur when the child was ill?

Children who have *febrile seizures* may develop *seizures* whenever they have a high fever, so the mother can tell you that this has happened before. It is important to make sure that the child **only** has *seizures* with high body temperature. If the child also experiences *seizures* without high fevers, he or she may actually have *epilepsy*. Children with *epilepsy* can get more *seizures* when they are sick.

3. Have any of the child’s brothers or sisters had *febrile seizures*?

Febrile *seizures* run in families sometimes. Mothers often recognize that fevers cause *seizures* in their children.

4. Has the child clearly been ill? What type of illness? Coughing? Diarrhea? Is the mother certain that there was body hotness?

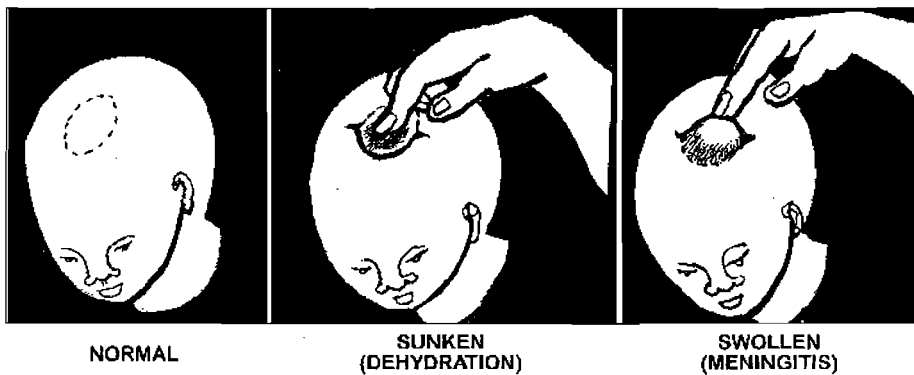
If a child has a *seizure* without a fever, then they **did not** have a febrile *seizure*.

## Examination

First, check the child's temperature. If the child is febrile, they probably had a fever when they had the *seizure*. Examine the head and neck to make sure there is no evidence of trauma or injury.

Simple febrile *seizures* are brief events. Afterwards, the child should wake up and be able to feed or eat. If the child does not wake up or one seizure follows another quickly with no return to consciousness, the child may have *status epilepticus*. *Status epilepticus* is an emergency. See page 80 on the treatment of seizures.

Next see if the child has neck stiffness which is evidence of *meningismus*. *Meningismus* occurs when there is inflammation of the covering over the brain and spinal cord. Gently flex the child's neck. If this appears to cause pain, the child may have *meningitis* or a brain infection causing the seizures. If the patient is an infant, check to see if their *fontanel* is bulging. Bulging *fontanels* and *meningismus* are not seen with simple febrile *seizures* and require urgent treatment. SEE CHAPTER #12-NEUROLOGIC EMERGENCIES.



Finally, try to decide why the child has a fever. A blood smear for malaria is a good idea if you can get one. Chest infections, diarrhea diseases, skin infections—all these can cause a fever. Even minor viral illness (like a cold) can cause fevers in some children. If the child has had a febrile *seizure*, your next job is to decide what caused the fever!

## Other Possible Problems

1. Cerebral malaria—this can cause *seizures* and needs emergent care. SEE CHAPTER #11- CEREBRAL MALARIA.
2. *Meningitis*—brain inflammation can cause *seizures* and fever. Children also have *meningismus* (*neck stiffness*). They may close their eyes tightly to light and they look very sick
3. *Seizure* without fever—children can have a single *seizure* for no real reason. (Remember—*epilepsy* is when people have more than one *seizure*)
4. *Epilepsy*—children with *epilepsy* can have *seizures* when they are sick. It is important to make certain that the *seizure* happened during a fever. If a child has seizures without fever, you may need to consider treating them for *epilepsy*.
5. Children can have seizures if they have head injuries. Head injuries can be due to falling and landing on their head or being struck in the head. Shaking a child is especially dangerous.



People should NEVER violently shake small children! Shaking can cause serious brain injury!

## Management

If you believe a child has had a febrile *seizure*, try to cool them off. Tepid baths or wetting them with a cloth in an open room may help a great deal to bring down their body temperature. Children with fevers need plenty of fluids, too. Encourage mother to breast-feed or provide plenty of ORS.

PARACETOMOL is an excellent way to bring down fevers. BRUFEN also works very well. ASPIRIN should be avoided in children, but if you do not have PARACETOMOL or BRUFEN and a child has had a febrile seizure, use aspirin. SEE THE DRUG DIRECTORY for doses. If a child has a febrile *seizure*, give them medicine to prevent fever for at least 3 days. If a child is vomiting and cannot keep the medicine down, you can give PARACETOMOL, ASPIRIN and PROFEN by rectum.

Try to decide what you think caused the fever. Treating the underlying cause of the fever is very important.

If a child has more than one *febrile seizure*, or has a *febrile seizure* lasting more than 10 minutes, you should also treat them with DIAZEPAM by injection or per rectum. SEE THE DRUG DIRECTORY.

## Guidelines for Follow-up

If the child has had more than a single *seizure* that day, consider keeping them in the infirmary, hospital, or your clinic for at least one night even if the child does not appear terribly ill. This is especially important if the parents live far from medical care. Observing the child for a day will help you be certain that important medicine for fevers and infections are given.

## Patient Education

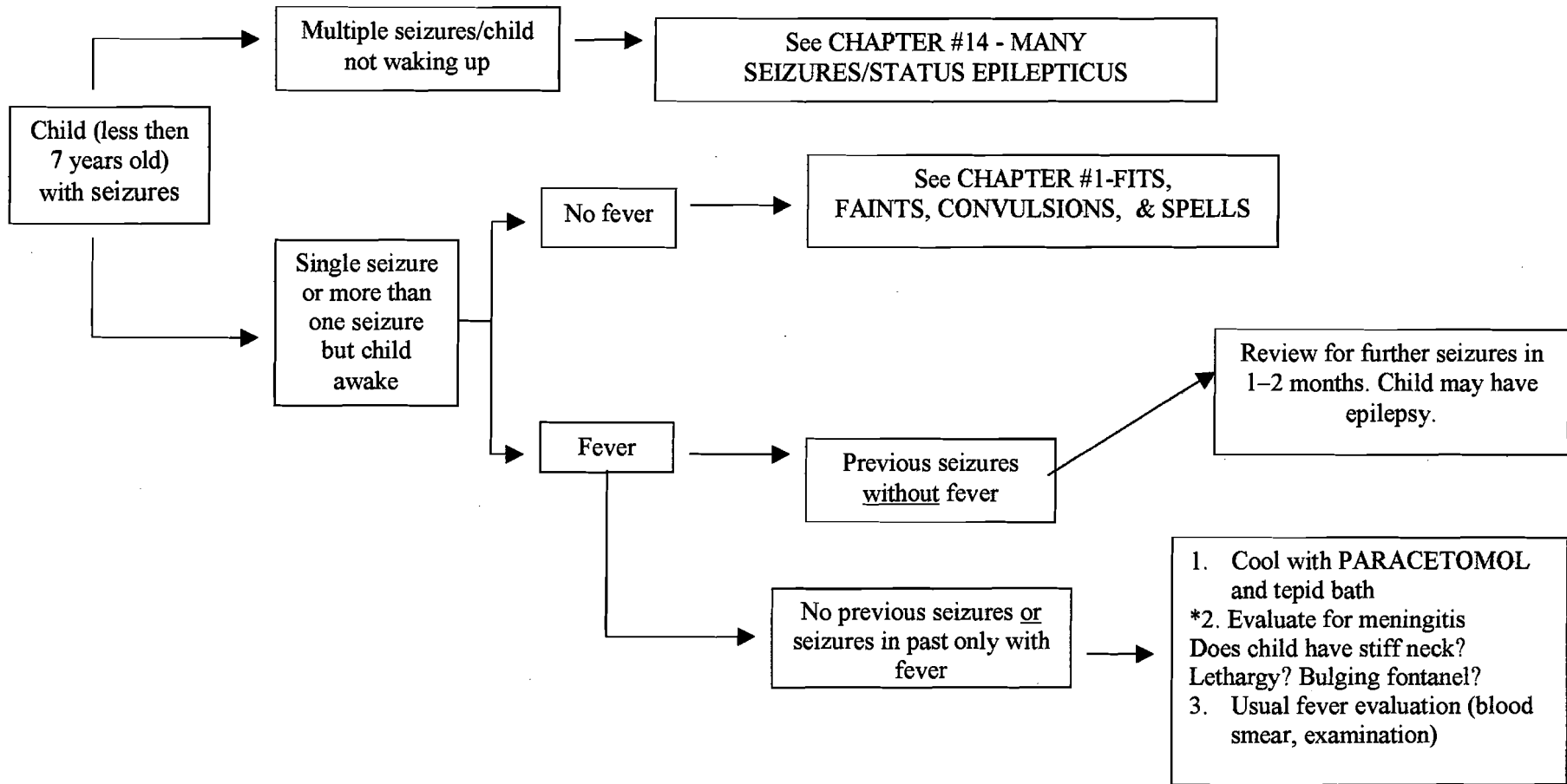
Mothers should be instructed NOT to bundle up children with fevers. This holds in the heat and causes the body temperature to get even higher. When children with febrile *seizures* get ill, their mothers should try to cool the child with a wet cloth or sprinkle them with water, give them a small dose of PARACETOMOL.

Since children who have febrile *seizures* once, often have them again with later infections/fevers, it is important to tell the families how to care for the child when seizures occur.

**Families should also be warned not to place anything in the child's mouth during a seizure. Sticks or other objects placed in the mouth can cause severe injuries. Liquids should not be poured into the child's mouth during the seizure or before the child is fully awake. During the seizure, the child should be held gently or placed on the floor out of the way of sharp objects or fire. The child's head should be tilted to the side. The family should try to bring the child to you for treatment when seizures occur.**

Sometimes it helps to assure the parents of children with febrile *seizures* that the child does not have *epilepsy*. Febrile *seizures* go away as children get older and do not require treatment with medicines like PHENOBARBITONE.

**Summary: Febrile Seizures**



\* When in doubt, treat for meningitis and get help. See CHAPTER #6-HEADACHE (ACUTE)



## Chapter #3-Tremors, Tics, or Other Unusual Movements

### Case Examples

1. Lovemore Banda is a 6 year-old boy brought by his parents because he has been acting very strangely. This boy was first taken by his parents to the traditional healer in their village, but he is still behaving strangely and they now come seeking your help. When you see him, he has odd writhing (snakelike) movements in his hands and cannot sit still. He is also making strange sounds (sniffing) and keeps blinking and shutting his eyes tightly.

2. Kenneth Matella is more than 50 years-old and comes to you complaining of “shaking”. He has a tremor in his hands and head—sometimes even his voice shakes! He has noticed the shaking for about 2 years but it seems to be getting worse. He has trouble with fine motor tasks like tying knots and carrying water in a full cup. He remembers that when his mother was very old, she also had this problem.

### Discussion

Involuntary movements such as tics, tremors, and the writhing movements (called “choreoathetosis”) are not very common, but patients may suffer a great deal if no treatment is offered.

Tics can be inherited or may be caused by recent infections with streptococcus (the same bacteria that causes rheumatic heart disease).

Tremors can be due to severe anxiety, but severe tremors, called “essential tremor” can occur in older adults and may also be inherited. Sometimes people give benzodiazepines such as DIAZEPAM for tremors. Unfortunately, patients quickly adapt to benzodiazepines such as DIAZEPAM. To continue to get good results from the medicine, they must take higher and higher doses. People may also get addicted to benzodiazepines.

### Other Key Points

Ideally, children who with tics and/or chorea should be seen by a doctor who can listen carefully to their heart to determine if they may also have rheumatic heart disease. These children may need regular treatment with antibiotics for heart protection.

Women may also develop chorea during pregnancy or from taking birth control pills. If a woman on birth control pills develops chorea, stop the pills! The movements should improve in a few days. Women who develop chorea during pregnancy are at high risk for complications and should be sent to the nearest hospital for review.

Unfortunately, patients who have been given antipsychotic medications for long periods in high doses (for example patients with schizophrenia) may also develop strange movement, especially in their face and lips. It may not be safe to stop the offending medicine if the patient gets dangerously psychotic. Try to get assistance in managing these individuals from a nearby doctor. If you do stop the medicines abruptly in such patients, the movements can get worse!

People who are heavy drinkers who suddenly stop drinking may also have a tremor.

## Questions to Ask

1. Have any relatives had similar problems in the past?

Many of these disorders tend to occur in families.

2. Has the patient ever had this problem before?

Women who had choreiform movements as a child may have a return of these symptoms when they become pregnant.

3. Are they taking any medication-especially medicines with female hormones like estrogen?

Any drugs containing hormones should be stopped to see if the movements stop.

4. Have they ever taken antipsychotic medicines before?

Ask carefully whether they have been given antipsychotics anytime in the past.

## Examination

Watch the patient before you examine them. They may be able to suppress their movements or tics for a short period of time, so watch them even while you are getting the history. Look closely for changes in muscle tone and strength, especially in the region of the body where odd movements are ongoing.

## Possible problems (Differential Diagnosis)

### Tics

1. Simple tic-minor motor or vocal tic lasting less than 6 months
2. Tourette's Syndrome-motor and verbal tics beginning in childhood and lasting more than one year. These individuals may also shout curses inappropriately, repeat whatever they hear and act in other strange ways.
3. Sydenham's chorea-Chorea and tics occurring in children usually after a streptococcal infection. See "Case Examples".

### Chorea

1. Drugs given for psychosis, like thiorazine and haloperidol can cause chorea as a side effect. If patients on antipsychotic agents develop movement disorders, the agents should be stopped and a physician consulted.
2. Chorea Gravidarum-chorea occurring in pregnancy or when family planning drugs that contain estrogen are given.

### Tremors

1. Physiologic tremor-We all have a slight tremor, some people's "normal" tremor get increased by anxiety, fatigue, or caffeine.
2. Essential tremor-tremor in the elderly that usually runs in families
3. Parkinson's Disease

Movement disorders are not common. If you see someone with a movement problem that is really causing them social embarrassment or difficulty functioning, try the medications mentioned here. If these fail and the problem does not resolve within 2-4 weeks, send them to a physician for review.

## Management

Tics and choreiform movements often improve with antipsychotic medications such as CHLORPROMAZINE or HALOPERIDAL.

For tremors, beta-blockers, such as ATENOLOL are much better drugs than DIAZEPAM and are not addictive. PRIMIDONE may also be used to treat tremor.

Parkinson's disease responds to levodopa therapy, but it is advisable to get a physician's opinion before making this diagnosis and initiating the drug whenever possible.

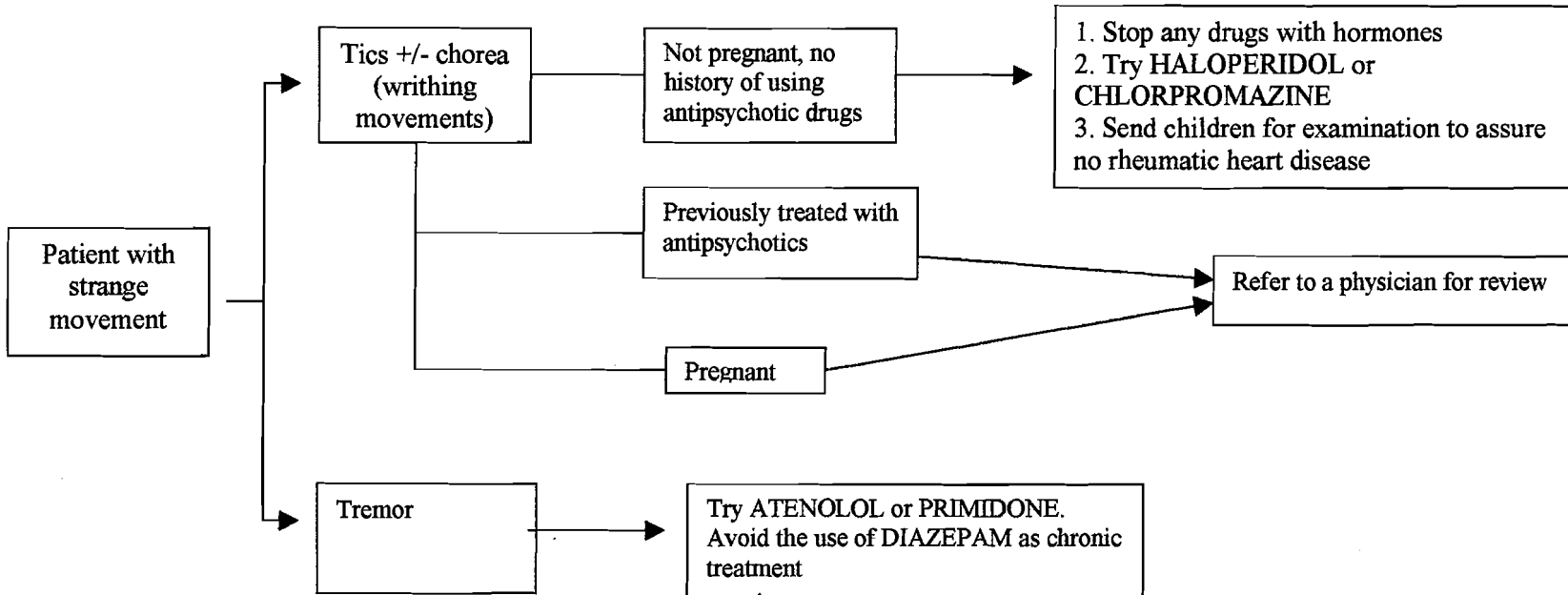
### Guidelines for Follow-up

If you start or stop a medication, see the patient back in 1-2 weeks to assure improvement.

Women with chorea in pregnancy should be reviewed by a physician and followed closely.

Many times, tics will resolve spontaneously and never return.

## Tremors, Tics, & Other Strange Movements



## Chapter #4-Burning or Numb Feet



### Case Example

1. Florence Monze is a 47-years-old woman who comes complaining of burning, painful feet. She has had this problem for almost a year. For the last 3 weeks, the burning has been so severe that she cannot sleep. Walking even short distance hurts her feet despite good shoes. Before the burning came, she noticed a little tingling and numbness in her toes. The numbness went away in her feet when the burning started, but now she has tingling and numbness in the tips of her fingers on both hands. Mrs. Monze is a bit heavy (85 kg), but is otherwise healthy.

2. Clever Mwinga is a 19-year-old who comes to clinic complaining of burning feet and lightening pains shooting from his lower legs down to his feet. Clever has been seen in clinic on several occasions since he came in with TB 5 months ago. He gets his TB medicine in your clinic. Clever is a bit thin. He came regularly for his TB drugs and seems to have recovered from the tuberculosis, but is in agony now from his burning feet. When you review Clever's chart, you notice that when he first came to TB clinic there was no PYRIDOXINE available and he received no PYRIDOXINE during his TB treatment.

### Discussion

Burning or numb feet (and sometimes even hands) are symptoms of a *neuropathy*. *Peripheral neuropathies* occur when the distant end of a *nerve* is damaged in some way. Since nerves that leave the spinal cord must travel great distances (all the way to your large toe!!) they are very sensitive to problems from poor nutrition, infections, and *toxins*. When nerves get sick, different symptoms can occur. These symptoms include-

1. Tingling
2. Burning
3. Numbness (that the patients complains about)
4. Lightening (shooting) pains
5. Numbness (that the patient does **not** complain about) but which can result in injuries. (This type of numbness is what you usually see in leprosy.)

Since the tips of the nerves that have traveled farthest from the spinal cord are the most sensitive to injury, people with *neuropathies* usually notice that the problem first started in their feet. The pain might begin in the tips of their toes and slowly (over weeks or month) creep up to include their ankles and lower legs. By the time the pain or numbness is in the mid-lower leg, the person may also have symptoms in their fingers.

### Other Key Points:

It is important to recognize *neuropathies* for many reasons. First, *neuropathies* may be a sign of an underlying problem, like diabetes, that needs treatment. Second, there are treatments that can help the sick nerves to heal. Third, treatment can help the painful symptoms. Finally, people with *neuropathies* can be at very high risk for traumatic injuries to their numb feet (look what happens to people with leprosy if it is not treated!). With good advice and care, many of these traumatic injuries can be prevented.

Common causes of neuropathy include-

1. HIV/AIDS
2. Diabetes
3. TB medicines (usually INH) especially when taken without PYRIDOXINE in patients with a poor diet or someone who also has HIV/AIDS
4. Malnutrition
5. Heavy alcohol use (beer drinking)
6. Syphilis
7. Leprosy

Because leprosy is caused by an infection, it acts a little differently than many of the other *neuropathies*. Leprosy can cause simple numbness without pain in the distribution of any nerve (not just in the distal extremities) and these nerves can become enlarged.

### Questions to ask

People with complaints of painful, burning feet should be asked questions to see if they may have one of the problems that commonly cause a *neuropathy* (those listed above).

1. Are both feet equally painful?  
*Neuropathies* always cause problems in both feet, not just one.
2. Is this someone who looks very thin? Has the patient lost a husband or wife to HIV/AIDS? Have they suffered from problems such as oral thrush and strange fevers? Have they been pre-counseled for HIV testing?
3. Is this someone who may have diabetes? Does the patient complain of thirst and frequent urination? Overweight people, like Florence in the first example, are more likely to have diabetes.
4. Has the patient been treated for TB in the past year? Were they given PYRIDOXINE to take, too? Did they take it?
5. Does the person complain of weakness in their legs?  
Neuropathies usually cause problems with sensation before problems with strength occur (go back to the NEUROLOGIC EXAMINATION in the blue section to review motor and sensory nerves). If a patient has numbness and a lot of focal weakness, it probably is not a neuropathy.

Of course, some people have more than one reason to have a neuropathy. The patient who has HIV may lose a great deal of weight and have a poor diet (either because of a poor appetite or because he cannot afford good foods). With HIV infection, he is more likely to catch TB and need medicine like INH. All these problems together can cause a very painful neuropathy!

## Examination

When someone comes complaining of numb or burning feet, you obviously want to examine their feet! Are there sores or wounds that look *chronic*? Also look at their hands.

Did the patient walk into the room? See if they can stand on their tiptoes. Can they bend in a deep squat and come up? Can they also pull their toes off of the floor and stand only on their heels? If they can do both of these things, then they do not have much weakness.

Three tests of the distant nerves (also called the *peripheral nerves*) should be performed.

1. Light touch-with the tip of a cotton swab or some soft cloth, can the patient feel a light stroke to the feet? Always touch the tops of the feet, especially if they do not wear shoes. Hard calluses on the soles of the feet will keep people from feeling light touch
2. Pain- With the tip of a sharp stick, also see if the patient can feel the prick. With their eyes shut, can they tell that you are touching their feet? Can they tell the difference between light touch and pricking? Remember never to prick someone hard enough to break the skin or cause bleeding.
3. Place in space (also called *proprioception*)- This is a funny thing to test, but can be very important. If I asked you to close your eyes and I moved your big toe up or down, even a little bit, you would be able to tell me which direction I moved it. If someone can't tell which direction their toe or even foot has been moved by someone else, then they have poor *proprioception*. One good way to test proprioception is to see if someone who is stable standing with their eyes open continues to be stable standing with their eyes closed. If people have problems standing with their eyes closed only, this is more likely to be a problem with proprioception, not balance!

## Other possible problems (Differential Diagnosis)

1. Spinal cord disease-If the patient has problems with leg strength and cannot hold their urine, consider spinal cord disease. SEE CHAPTER #6-BACK PAIN.
2. Acute inflammatory neuropathies-diphtheria, Guillain-Barré syndrome. These problems are associated with loss of strength but the earliest symptoms can be pain. In this case, the pain has probably only been going on for a week at most. SEE CHAPTER 9-ACUTE PARALYSIS.

## Diagnosis

Try to decide by the history of the patient what you think the problem is and then check the following for the patient-

<b>If you think the problem is...</b>	<b>Then...</b>
Diabetes	Check a blood sugar (fasting)
Nutrition problem	The red blood cells can be looked at. If the red blood cells are low ( <i>anemia</i> ) and too big ( <i>macrocytic</i> ) then the patient may have B12 deficiency. Patients with B12 deficiency often have problems with <i>proprioception</i> .
HIV/AIDS	Refer patient for pre-counseling
For problems with <i>proprioception</i>	Checking for syphilis, especially if there is no clear cause for the neuropathy, is a good idea.

## Management

Cause of Neuropathy-	What to do-
Diabetes	<ol style="list-style-type: none"> <li>1. Refer for treatment of diabetes</li> <li>2. Treat pain</li> <li>3. Educate patient about foot care</li> </ol>
HIV/AIDS	<ol style="list-style-type: none"> <li>1. Pre-counseling</li> <li>2. Treat pain</li> </ol>
TB medicines	<ol style="list-style-type: none"> <li>1. Begin PYRIDOXINE and continue for 6 months after completing TB medicines</li> <li>2. <b>Do not</b> stop TB treatment</li> <li>3. Give MULTI-VITAMINS if available for at least 6 months</li> <li>4. Treat pain</li> <li>5. Recommend diet with green leafy vegetables. Nshima should be eaten with a relish such as pumpkin leaves.</li> </ol>
Malnutrition	<ol style="list-style-type: none"> <li>1. Give MULTI-VITAMINS in double the normal doses for at least 6 months</li> <li>2. Treat pain</li> <li>3. If the patient has proprioception problems and macrocytic anemia, consider referring them to the doctor for B12 shots.</li> <li>4. Counsel regarding proper nutrition-oil, eggs, meat, <u>and</u> some green leafy vegetables (instead of just nshima) are best</li> </ol>
Syphilis	<ol style="list-style-type: none"> <li>1. Check RPR and treat as tertiary if positive</li> <li>2. Treat pain</li> </ol>

Pain treatment for neuropathy can include many different medicines. Their names are listed here. See the DRUG FORMULARY for details on doses.

For pain-

1. PARACETOMOL, BRUFEN, ASPIRIN-This is worth trying, but will probably not work for most people. Try other drugs first if available.
2. Tricyclic antidepressants-AMITRYPTILINE, NORTRYPTILINE
3. CARBAMAZEPINE- same doses as used for *seizures*
4. VALPROIC ACID
5. PHENYTOIN
6. For HIV/AIDS patients who are in a great deal of pain from a neuropathy, it is reasonable to consider using *narcotic* drugs, such as MORPHINE, CODEINE, PETHIDINE or METHADONE if these drugs are available.

## Guidelines for follow-up

People with *neuropathy* may need to be treated for the pain for a long time. Also, you will want to check on their other problems (diabetes, syphilis, malnutrition). After you begin treating them with pain medications, have them return to see you in at least one month. At this time, you can increase the medicines if needed. This will also give you a chance to re-examine their feet and make sure there are no foot ulcers or injuries.

## Other Actions

PYRIDOXINE is a very important vitamin. If you believe that someone has a neuropathy from TB medications, giving them PYRIDOXIME is the treatment. **But** if someone takes more than the recommended dose of PYRIDOXINE, **they can get a neuropathy!!** PYRIDOXINE has to be given in



exactly the right amount. If you are eating a healthy diet and taking no TB medicines, then your body is probably already getting the right amount of PYRIDOXINE already. If you are taking TB medicines, extra PYRIDOXINE is needed, but only a small amount. If too much PYRIDOXINE is taken, it can damage the nerves and cause a neuropathy.

## Patient Education

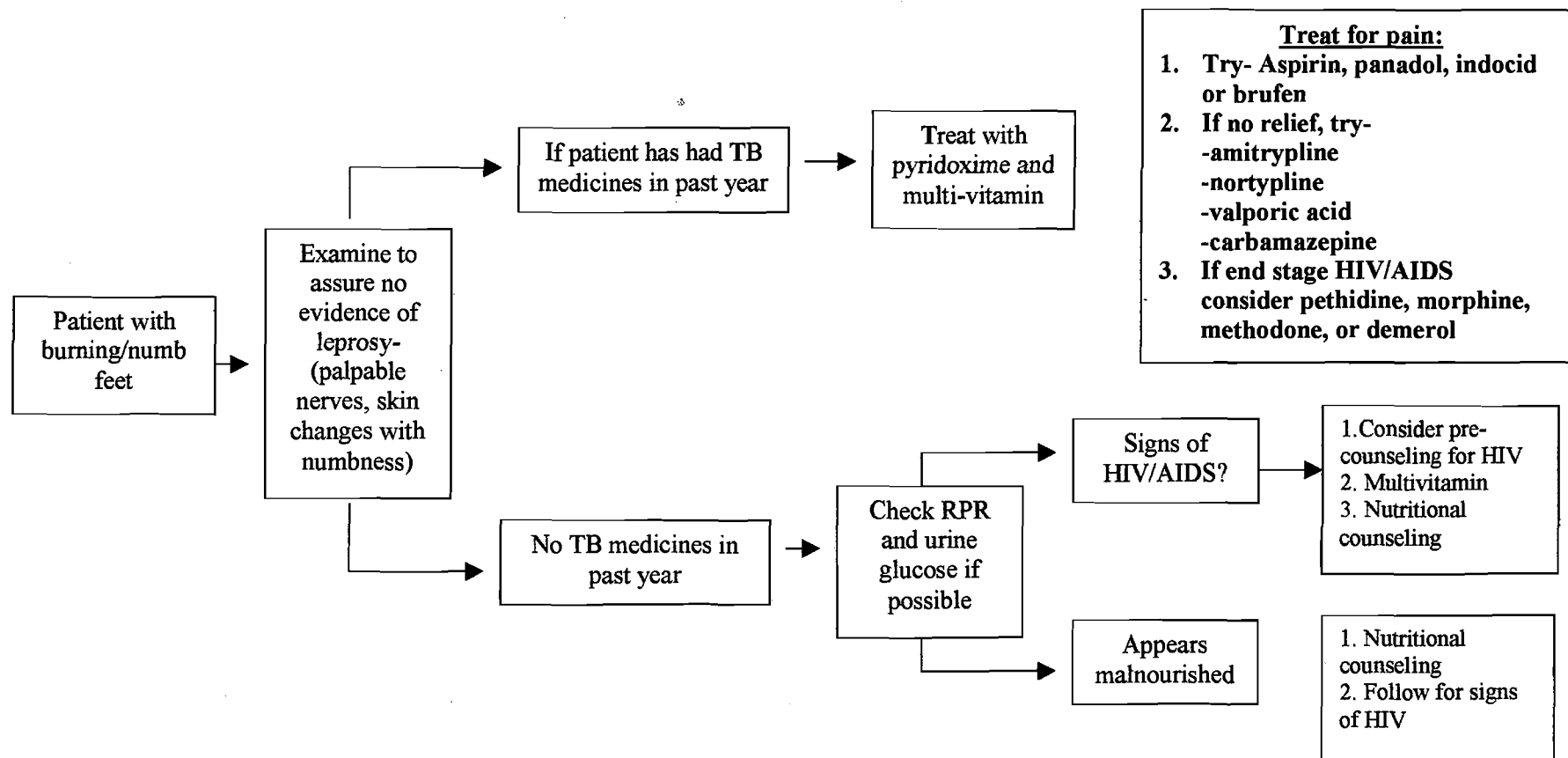


For people with severe neuropathies, fire can be deadly! Warn them not to sit with their feet near any fire, even if they are wearing shoes!

Because there is damage to the nerves in the feet, patients with *neuropathies* can hurt their feet by stepping on sharp stones or even in fire and they might not notice. Patients with *neuropathies* need to be taught how to care for their feet. It is important for them to wear shoes. The best shoes for them are the shoes made for leprosy patients, but any shoes (that are not too tight or rub blisters) are better than going barefoot. Diabetics are especially likely to have foot wounds that get infected and can result in amputations. Patients should wear shoes and examine their feet every day to look for sores or wounds. Any injuries should be cleaned with soap and water and brought to you for care if the wound is severe, does not heal in a few days, or seems to be infected. Explain to the patient what an infected wound looks like--swollen, red, warm and painful.

The medicines used to relieve the pain of neuropathy may take at least 2 weeks to begin to work. You must explain to the patient that the medicine for their pain may not work right away, but must be taken faithfully every day for 2-4 weeks to relieve the pain. Taking more medicine right away will not help. The dose must be given daily and will gradually build-up in their bodies.

### Summary: Burning or Numb Feet



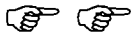
## Chapter #5-Facial Paralysis

### Case Examples

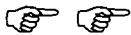
Alice Mweka woke up this morning and noticed drooping on the right side of her face. She has trouble closing her right eye and when she tries to drink, the liquid comes out the side of her mouth. Her face is twisted to the side and doesn't move on the right side when she speaks. She was feeling very well before this happened.

### Discussion

Facial paralysis is a common problem and is often called *Bell's Palsy*. Facial paralysis should only be considered *Bell's palsy* in the following conditions-



1. The weakness includes weakness on half of the forehead on the affected side and is not associated with arm or leg weakness.
2. The patient does not have herpes zoster on their face or in the ear
3. All other cranial nerves have been examined and are entirely normal
4. The person is otherwise well with no fever, neck stiffness or delirium.



If you are absolutely certain that the person presenting with facial paralysis meets all four of the conditions listed above, treat the *Bells' Palsy* and assure the patient that nothing serious is wrong.

Several serious conditions may present with facial paralysis and need to be considered if the patient does not meet all the conditions.

### Key Points

Patients with any evidence of serious infection, zoster on the face, drainage or sores in the ear, other cranial nerve abnormalities, or weakness on one side of the body DO NOT HAVE BELL'S PALSYYY!!!

### Questions

1. Do they have a fever? Headache? Recent convulsions?
2. Are they having facial numbness? Double vision?
3. Do they notice weakness on one side of the body?
4. Have they had recent sinus infections with headaches? Or severe tooth infections?

Yes to any of these questions should make you worried that something else is going on. See "Differential Diagnosis".

### Examination

Carefully examine all of the patients cranial nerves. Make certain that the forehead is also weak on the side with facial weakness! Ask them to raise their eyebrows and wrinkle their forehead. They should not be able to do this!

Look for signs of weakness on one side of the body. Ask them to hold their arms out straight ahead of them and close their eyes.

Look in the ear on the side of the facial weakness. Also look in their throat. If you see sores or discharge, this may not be *Bell's Palsy*.

### **Possible Causes (Differential Diagnosis)**

Other than Bells' Palsy, the following problems can cause facial weakness-

1. Stroke-Usually other cranial nerves will be affected or there will also be some unilateral (one-sided) body weakness.
2. Tumor-Usually other cranial nerves will be affected or there will also be some unilateral (one-sided) body weakness. The patient may also complain of headaches or seizures.
3. Abscess in the brain-Usually other cranial nerves will be affected or there will also be some unilateral (one-sided) body weakness. Children are especially likely to have TB abscesses in the brain that present with facial weakness.
4. Ramsey Hunt Syndrome-Herpes zoster infections in the ear or throat can infect the nerve to the face. This is especially common in people with HIV/AIDS.

Anyone with facial paralysis which is not Bell's Palsy should be referred to a physician for review.

### **Management**

Once you are absolutely sure the person has Bell's Palsy and not a more serious problem, you can assure them that the problem is not serious and the face will most likely improve over the next 2-4 months.

Also recommend-

1. Avoiding dusty places. Since they cannot close their eye, the eye can become scratched and infections can occur. If you have sterile saline solution (like normal saline IV fluid), rinsing the eye with this may bring some relief.
2. If the patient has a red eye with discharge, try to use antibiotic eye ointments if these are available. Severe eye infection with pain and discharge lasting more than 1-2 days should be referred to a doctor, especially if you have no antibiotics eye drops or ointment.
3. Pain may respond to INDOCID, ASPIRIN, or BRUFEN.

### **Other Actions**

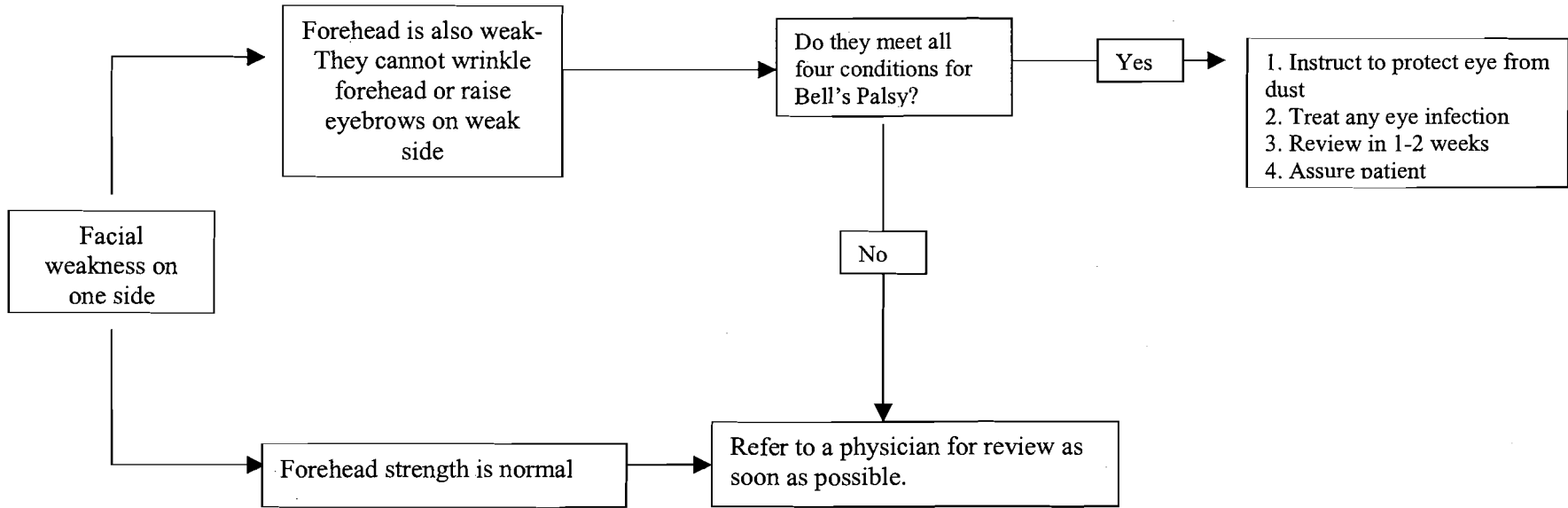
Even if you are certain that this is Bell's Palsy, review the patient again in 1-2 weeks and review their examination to assure no new problems have occurred that might suggest some more severe problem underlying the facial paralysis.

### **Patient Education**



No one should ever place unclean solutions or substances in the eye! Mud or dung are especially harmful and can result in severe infections and permanent visual loss. Warn people not to apply such compounds to their eyes!

### Summary: Facial Paralysis



#### Requirement for Bell's Palsy

1. The weakness includes weakness of the forehead on the affected side and is not associated with arm or leg weakness.
2. The patient does not have herpes zoster on their face or in the ear-if the patient has zoster lesions in the ear, refer them to a doctor.
3. All other cranial nerves have been examined and are entirely normal
4. The person is otherwise well with no fever, neck stiffness or delirium.

## Chapter #6-Headache (Acute)

### Case Example:

Samual Nzala is a 24-year-old gentleman brought by his family to the clinic because of a severe headache. The family reports that he has “malaria”. His temperature is 39.7 degrees, but his MP’s are 0. When you speak with him, he is lying on the bed in clinic with his eyes shut looking very uncomfortable. He keeps his eyes shut to the light and moves as little as possible. He did not feel well yesterday, but was working earlier this week with no problems. He has never had headaches before except when he has malaria. This is the worst headache he has ever had.

### Discussion:

Acute headaches are those that come on suddenly. People in places that have a great deal of malaria sometimes think all headaches are from malaria, but this is not true! Many other problems can cause headaches and are just as important to treat as malaria. When people have malaria, they often have a headache, but they also complain of chills, backaches, body aches and weakness.

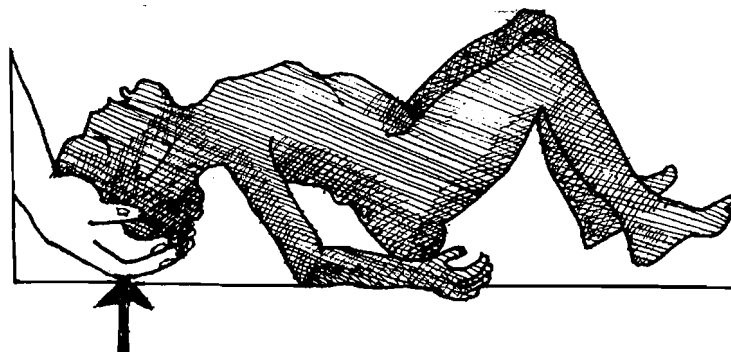
If a patient complains of frequent headaches (a bad headache that comes every few weeks and lasts a few hours) this is a *recurrent* headache. SEE CHAPTER #5-HEADACHES (RECURRENT). When people come with a severe headache unlike any headache they have previously suffered with, there are a few serious conditions, beside malaria, you must consider.

1. Meningitis
2. Stroke
3. Other neurologic problem

Each of these problems needs special treatments and evaluation. You may send these patients to a nearby hospital or doctor for care, but what you do for them in the beginning can make all the difference. Just recognizing their problem and referring them somewhere in time for them to receive important medicine can be the difference between life and death.

### Key Points:

1. Meningitis can begin with a headache and is a very dangerous condition. Adults with meningitis complain of headache and neck pain. They usually have a fever and may be very sensitive to lights and sounds. If they have been sick for a few days before coming to see you, they may slip into a coma. If patients are brought to you in coma, it is important to talk with the family about the patient’s symptoms (because the patient cannot tell you!). People with *meningitis* have infection and swelling in their *meninges* (the thick covering over the brain and spinal cord). If you try to flex their neck gently (by placing their chin on their chest while they are lying on their back relaxed) they may cry out in pain. This pulls the swollen *meninges*.



2. *Stroke* is when part of the brain is damaged by lack of blood flow or breaking of blood vessels with bleeding in the brain. When strokes are due to broken blood vessels, the patient may first complain of a severe headache. Usually this is followed by numbness or *paralysis* either around the mouth or on one side of the face or body. This type of *stroke*, meaning a *stroke* that presents with a severe headache, is most likely to occur in a patient who has had *hypertension* (high blood pressure) in the past.
3. Many other problems in the brain can cause severe headaches. Anyone who has *focal* neurologic problems (such as weakness or numbness on one side of the body) or loss of vision with a new headache needs to be seen by a doctor if at all possible.

## Questions:

Try to determine if this headache is a new problem or if the patient frequently has such headaches. *Recurrent* headaches are discussed in the next chapter.

If the headache is a new problem, some especially important questions to ask include-

1. Has the patient had head trauma?

Be certain to ask the patient or family about any blows to the head. If the patient was struck hard enough to cause them to become *unconscious* (faint or black out), then they may have an injury that requires emergent care-SEE CHAPTER #10-HEAD INJURY. In older patients (those over 50 years old), the blood vessels in the brain become weak and can rupture and bleed even after a very minor injury.

2. Has the patient been ill recently? Is this a patient with TB or HIV/AIDS?

People with HIV are likely to get a different type of *meningitis* that requires special antibiotics. People with pneumonia may also develop a *meningitis*. Pregnant women or women who have recently delivered are more prone to meningitis. Children suffer from *meningitis* more than adults.

3. Are there other problems too? Does the patient complain of *focal* weakness? Numbness? Double vision? All of these suggest stroke or some other problem of the nervous system.

Finally, infants and children with *meningitis* can be difficult to recognize because *meningitis* looks a lot like malaria in these youngsters. If a child with malaria is not responding to anti-malarial medications or, in fact seems to be worsening, it is very important to consider if they could have *meningitis*. Beginning treatment with antibiotics is critical **because QUININE, CHLOROQUINE, and FANSIDAR do not treat meningitis**. If the *meninges* over the brain are infected for very long without proper treatment, permanent brain damage can occur. People with permanent brain damage from *meningitis* may have learning disabilities (SEE CHAPTER #8: THE SLOW CHILD), hearing loss or even epilepsy. *Meningitis* can only be diagnosed with a *lumbar puncture*, but if you have a child or infant with a fever who has negative MPs or is not improving within 1 day on anti-malarial treatment, you need to consider *meningitis*. Start *meningitis* treatment as shown below and refer them to a doctor. Children may develop a respiratory tract or other infection in addition to malaria as a cause for persistent fever despite quinine. Be careful not to attribute fevers to minor infections if *meningitis* may be an underlying problem.

## Examination:

People with severe headaches may not want to be examined, but it is very important that you complete as much of the neurologic examination as possible.

Be certain to look for signs of trauma (like bruising or blood on the head), especially if the patient is not fully alert. Anyone who started with a complaint of headache and develops coma is a neurologic emergency. SEE CHAPTER #13: COMA.

Does the patient have a stiff neck? Is there pain when you try to flex the neck? Is there fever?

Keep in mind that any abnormalities in the neurologic examination of a patient with a new headache probably needs to be seen by a doctor. The real question is whether YOU should give antibiotics or antimalarials while the patient with abnormal exam findings is waiting to reach the doctor.

## Possible Causes (Differential Diagnosis):

New severe headaches can be due to many problems. These include-

*Malaria (especially cerebral malaria)*-very few adult Africans will get cerebral malaria with MPs 0 or 1. If an adult African has a severe headache and fever but has MPs negative, **think meningitis.**

*Meningitis*-Can occur in anyone but is especially likely in adults with HIV, pregnant women, infants, and children who have had chronic ear infections.

*Stroke*-Most likely to occur in patients over 40 years old, especially those who have *hypertension*.

*Giant cell arteritis (GCA)*-not common but if an older person sees you with new headaches, especially if they have had any episodes of visual loss, they need to see a doctor as soon as possible.

*Trauma*-head injuries can cause acute problems due to bleeding in or around the brain.

*Other infections*-Almost any infection (like a bad cold) can cause a headache. The key is whether the headache is really the primary complaint and whether or not they have meningismus or other evidence of disease, such as a recent seizure. Does everything hurt...or do they have a bad headache?

## Diagnostic Evaluation

The most important thing to do in caring for a patient with a severe headache is to determine if there is a worrisome underlying problem. If the patient has a fever with negative MPs suggests a brain infection or your neurologic examination shows *focal* weakness or numbness, then the patient needs to be seen by a doctor. The doctor may decide to do a lumbar puncture or other tests. **If you suspect meningitis and a doctor cannot see the patient within one hour, begin antibiotic treatment yourself.**

## Management

**Meningitis** (headache, fever, stiff neck, *photophobia, phonophobia*)

**If MPs negative-**

Refer to doctor and treat with for meningitis (SEE DRUG DIRECTORY FOR DETAILS).

**If MPs positive-**

Treat them for malaria and *meningitis*. Send them to the nearest doctor.

<u>Infants</u>	<u>Children</u>	<u>Adults</u>
The best drug is... <b>AMPICILLIN + GENTAMYCIN</b>	The best drug is... <b>CEFTRIAZONE</b>	The best drug is... <b>CEFTRIAZONE</b>
If you have none then use Chloramphenicol + gentamycin, next use...	If you have none then use CHLORAMPHENICOL, next use...	If you have none then use CHLORAMPHENICOL, next use...
CIPROFLOXACIN, next use...	PENICILLIN, next use	PENICILLIN, next use
PENICILLIN, next use	CIPROFLOXACIN, next use...	CIPROFLOXACIN, next use...
AMOXACILLIN, next use...	AMPICILLIN, next use...	AMPICILLIN, next use...
BACTRIM, next use...	AMOXACILLIN, next use...	AMOXACILLIN, next use...
ERYTHROMYCIN, next use...	BACTRIM, next use...	BACTRIM, next use...
CLINDAMYCIN, finally use...	ERYTHROMYCIN, next use...	ERYTHROMYCIN, next use...
METRONIDAZOLE or any other antibiotic you have available.	CLINDAMYCIN, finally use...	CLINDAMYCIN, finally use...
	METRONIDAZOLE or any other antibiotic you have available.	METRONIDAZOLE or any other antibiotic you have available.





Notice that the order of the drugs listed is important. Use the one closest to the top of the list that you have available.

If you have none of the antibiotic listed, use any antibiotic you do have available and refer to the nearest doctor. Any antibiotic is better than nothing is if someone has meningitis.

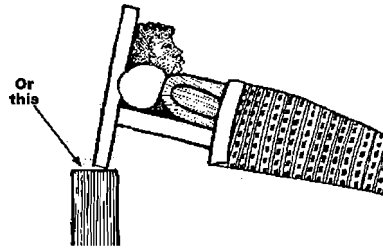
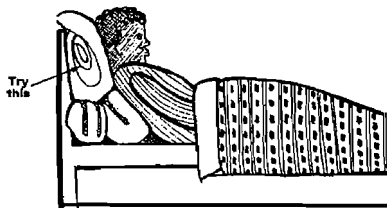
If you suspect a stroke or some other nervous system problem and find *focal* abnormalities on exam, send them to the nearest doctor.



Be certain to write down what you found abnormal in the neurologic examination and tell that to the doctor about any medicines you gave before sending the patient. This information is very helpful.

### Guidelines for Follow-up:

If you decide that a patient needs to see a doctor for possible *meningitis* and the doctor cannot see them within 1 hour, you should give them the first dose of antibiotics (hopefully CHLORAMPHENICOL) and send them to the doctor as quickly as possible. If the patient is too ill to travel, you may need to send for a doctor and treat the patient until the doctor has arrived. Continue to give the patient antibiotics as directed (SEE THE DRUG DIRECTORY) until help arrives. Keep the patient's head elevated. Do not let them lie flat. Use pillows or clothing to prop up the head of the patient. If you have bricks or blocks available, put some under the top part of the patient's bed and prop up the whole top half of the bed. If the sick patient is an infant or child being held by the parent, make certain they hold the child's head up too. Continue antibiotics (and antimalarials if you suspect malaria) until help arrives.



If you are not certain whether the patient needs to be seen by a doctor, it is best for you to see them again very soon. If you can, keep them in your clinic overnight for observation and re-examine them again the next day. If they live nearby, you may be able to have them come back the next day. Until you are certain that they do not have *meningitis* or some other serious problem, you should evaluate them frequently.

### Other Actions:

If the patient has a high fever, give them PARACETAMOL before sending them to the hospital.



You should be certain and write clearly in the patients medical record exactly what you were told about their symptoms, what you found when you examined them (including any fever) and finally but perhaps most importantly, clearly indicate any medicines they were given by you before sending them.

This is very important. If you give them PARACETAMOL and they arrive with no fever, the clinical officer or doctor who sees them next may not think they are very sick because they have no fever. If you note that they had a fever and you gave them medicine to relieve the fever, then the next medical care person who sees them will know how sick they are.

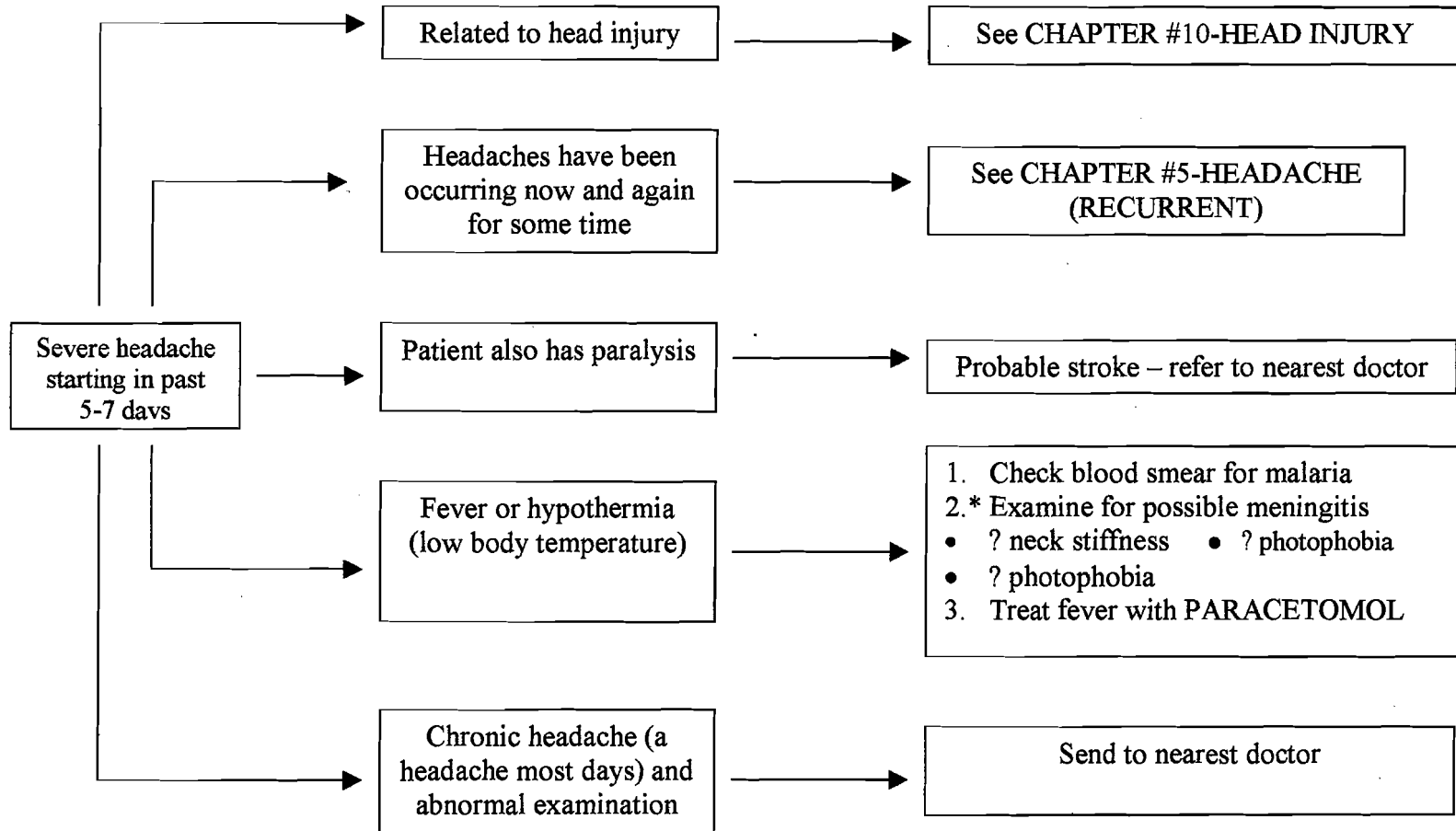
In children, it is especially important to remember to give PARACETAMOL because with high fevers and *meningitis*, children can have *seizures*.

### Patient Education:

If you believe the patient has a serious problem, then you have to make certain that the family and patient understand how important it is to see the doctor and take the medicines now.

Make certain that the family does not believe the single dose of medicine you gave them will cure the patient. If the patient has *meningitis*, more than a single dose of medicine will certainly be needed.

**Summary: Headache (Acute)**



\* When in doubt, treat for meningitis and get help!

## Chapter #7-Headache (*Recurrent*)

### Case Example

Purity Siame is a 26-year-old who comes to see you about headaches. She has suffered from headaches before. This visit she is worried because the headaches are sometimes severe enough to keep her from being able to work. Soon, it will be time to harvest the maize and she is afraid that the headaches will make her unable to collect the food needed for her family. She has a bad headache almost every week lasting 3-4 hours. She usually knows when the headaches are going to start, because she sees flashing lights before the pain begins. The headaches sometimes make her vomit and when she has a headache, the light hurts her eyes (*photophobia*). If she can, she lies down in a quiet, dark place until the pain passes. If she sleeps, she often feels better after waking up. One of her sisters has headaches, too. Her mother tells her that her grandmother suffered from similar headaches when she was young.

### Discussion

“*Recurrent*” headaches are those that go away and return several times with the patient feeling fine in between the episodes. This is what Purity is describing above. Recurrent headaches can be from *migraines*. *Migraines* are headaches that come and go, usually in women. We do not know why these headaches bother women more than men. *Migraines* also tend to run in families. Sisters or a mother and daughter may have the same type of headaches.

Although *migraine* headaches are not dangerous by themselves, but they do cause a great deal of misery if they occur often enough. Also, as with Purity, these types of headaches can be terrible enough to keep people from working when it is very important that they be healthy (like when the maize is ripe and must be harvested).

Luckily, there are many medicines that can help treat the headaches. Some medicines decrease headache pain immediately and other medicines, if taken every day, will prevent the headaches from coming so often. There are also important things people can do themselves (besides medicines) that may help decrease the number of *migraines*, they have.

### Key Points

*Migraines* can occur in men. They just happen more often in women. Most people with *migraine* headaches develop them by the time they are in their 30s. If you see someone who is in their 40s or older who has *recurrent* headaches, you must consider other problems. Patients over 50 who come to you with recurrent headaches need to see a doctor for review if possible.

*Migraine* headaches are most common in young, healthy people. If the patient is older or has an underlying illness, like HIV, syphilis, or TB, do not assume that they just have *migraines*. These people are at risk for other headache-related problems besides *migraines* and need to see a doctor, if possible.

### Questions to ask:

1. How long has the patient been having these headaches? Do they feel completely normal in between the headaches?  
If these are *migraines*, they should not have weakness, numbness or fevers and should feel completely fine when they have no headaches.
2. Does the patient have visual changes with dark spots or flashing lights before the headaches come? These symptoms are called *visual auras* and happen in almost half of people with *migraines*. If patients describes visual auras occurring before their headaches begin you can be almost certain that they have migraines.

3. Have they had any strange weakness or numbness on one side? Any unexplained weight loss or fevers? If so, it may be better to have a doctor see them and determine if the patient has an underlying infection or other problem.
4. When the headaches come, do they find they are very sensitive to light (*photophobia*) and sound (*phonophobia*)? Are they sick to their stomach? These are common signs associated with migraines.
5. Has the patient started any new medicines recently? Some medicines, especially birth control pills and blood pressure medicines, may cause patients to have worsening *migraine* headaches.
6. Does anyone else in the family suffer from such headaches? Remember, *migraines* often run in the family.
7. Has the patient had convulsions, fits or seizures? If so, this is probably not *migraine* and they need to see a doctor as soon as possible.

## Examination

People with *migraine* headaches should have a normal neurologic examination. It is important that you examine the patient completely to make certain everything is normal. If there are problems aside from brief, less than one hour, visual auras, such as cranial nerve abnormalities, weakness, numbness or a fever, this may not be a *migraine*.

## Possible Problems (*Differential Diagnosis*)

*Migraines* are an annoyance but are not a serious illness. Important problems that can cause recurrent headaches and be mistaken for migraines include-

1. *Slow growing tumors*-Patients with slow-growing tumors usually have some weakness or numbness that does not improve. Family members may notice that the patient is not acting normally. People with slow growing tumors can have visual loss. *Seizures* may also be a warning of such tumors. Remember to ask about *seizures* in anyone who presents with recurrent headaches.
2. *Infections*- Infections in the brain or sinuses can cause headaches. Patients with a fever and thick nasal drainage may have a sinus infection. If this is a patient with weight loss or health problems that suggest HIV/AIDS, headaches could be due to a brain infection, such as *Cryptococcal meningitis*. It is important that these patients see a doctor since a *lumbar puncture* may be indicated.
3. *Pre-eclampsia* -New headaches during pregnancy can be evidence of several problems. If a woman comes to you with headaches that have begun during pregnancy, refer for review by a doctor.
4. *Hypertension*-Severe *hypertension* can cause headaches and if untreated can result in stroke or heart failure.
5. *Refractive visual problem*-Occasionally people who need glasses can get headaches from straining their eyes. These headaches tend to occur during the eye strain and are not typically severe.

Patients with migraine should be completely normal in between headaches. If they are not completely normal between headaches, it may be best to refer them to the nearest doctor. If the doctor thinks the patient has migraine headaches, they can send them back to you for treatment!

## Management

Medicines are only one part of the treatment for *migraine* headaches. There are many things a patient can do to improve their headaches. These have been listed below as "Patient Education".

There are two ways to approach the treatment of *migraines*.

### 1-Abortive Therapy

Treat the bad headaches when they come but do nothing until then. This is called *abortive therapy*. You may choose to do this if the headaches only come 1-2 times a month and do besides take medicines not cause the patient to miss too much work. Remember to look at the DRUG DIRECTORY for doses.

For *abortive therapy* you can try one of these-

PARACETAMOL  
ASPIRIN  
BRUFEN

AND one of these (especially if vomiting and nausea are a big problem)

PROCHLORPERAZINE  
PROMETHAZINE  
CHLORPROMAZINE  
DIPHENHYDRAMINE

### 2-Prophylactic Therapy

Give the patient a medicine every day whether they have a headache or not. This is called *prophylactic* treatment. *Prophylactic* treatments will help the headaches to occur less often and cause the headaches to be less severe when they do happen. It is important to let the patient know that there may still be some headaches. The goal is to make the headaches less often and less severe, but it is unlikely that the headaches will go away completely. If people have 4 or more bad headaches a month, they probably need to be on *prophylactic* treatment. **They should still be given abortive treatments to treat the headaches that do occur.**

*Prophylactic* medicines include one of the following-

PROPRANOLOL/ATENOLOL/METOPROLOL  
VERAPAMIL  
AMITRYPTILINE  
NORTRYPTILINE  
CARBAMAZIPINE

## Guidelines for Follow-up

When you first see someone who has migraines, you will probably start them on a new medicine. It is best if you see them again in about a month, see how they are doing on the new medicine and then **re-examine** them carefully at least every 3-6 months to make certain that they still have a normal neurologic examination. If at any point the patient you thought had migraines develops abnormal exam findings, send them to the nearest doctor. If you place someone on *prophylactic* therapy, try to see the patient at least every three months. Consider stopping the prophylactic if the patient have no headaches for 6 months. Of course, if the headaches come back, you may have to re-start the medicine.

If you see a patient who suffers from a chronic, rather than recurrent headache (meaning they have a headache most of the time, it is VERY important to conduct a full physical examination. Anyone with a chronic headache and abnormal exam findings should be referred to a physician for further assessment as soon as possible.)

## Patient Education

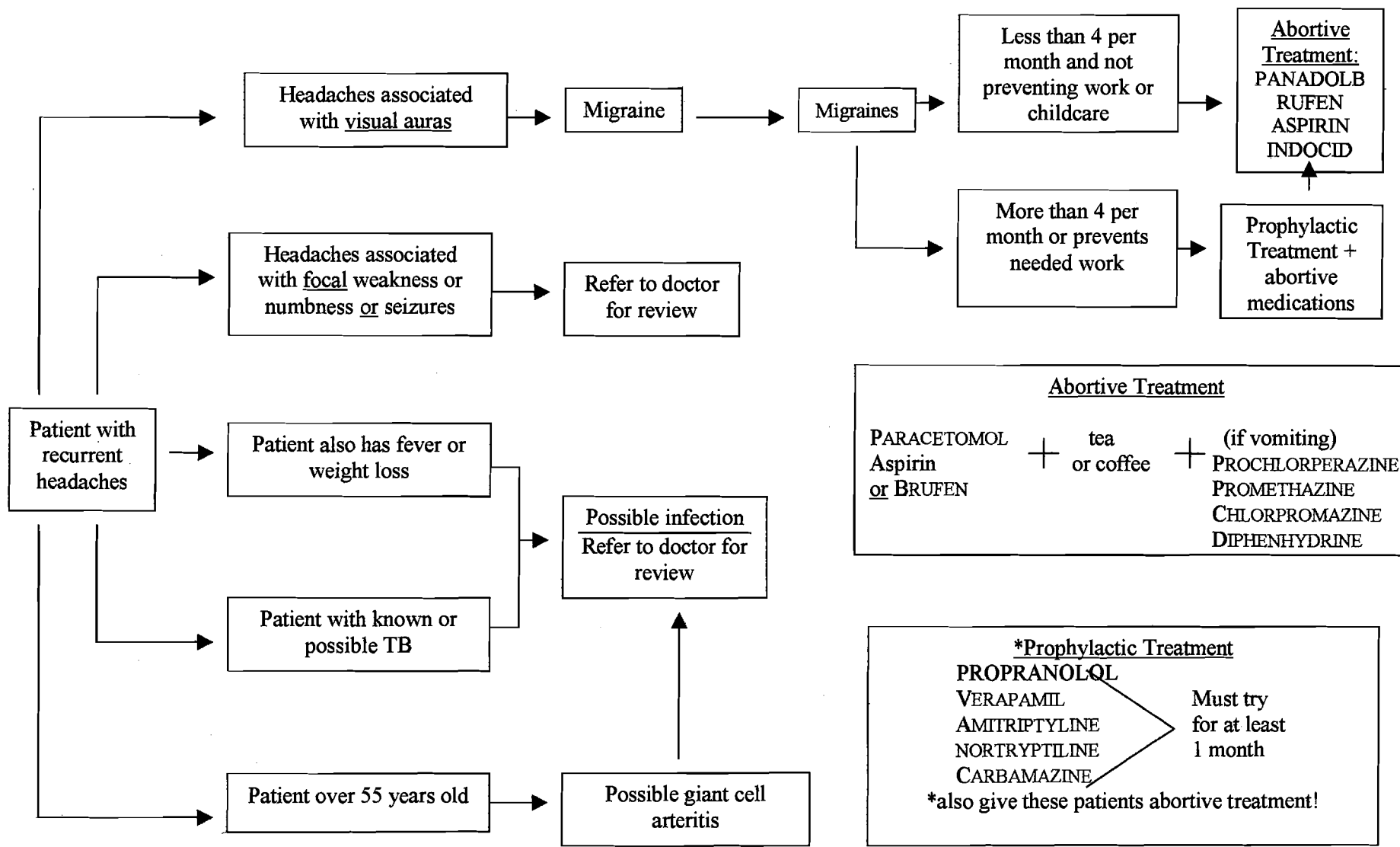
Luckily, there are many things a patient can do to ease their headaches that do not involve medicines.

Diet-Ask the patient if any foods seem associated with their headaches. Cheeses, smoked meats and chocolate can bring on *migraines* for some people. The patient may have to stop eating these foods. Also, intake of beer and other *alcoholic* drinks should be decreased since these can cause headaches to worsen. When the patient begins to first have a headache, they may find that coffee or tea taken with aspirin or one of the other abortive drugs will stop the headache early. Tea and coffee (black with no sugar or milk)

contains *caffeine* and may help *migraines* when taken in small amounts, but daily intake of caffeine or large quantities of caffeine-containing drinks should be avoided..

Sleep-A very regular sleep schedule is important for controlling *migraine* headaches. The patient should try to go to bed and **wake up at the same time every day**, even on weekends. This is important. *Migraines* worsen if the sleep schedule is not regular. At least 8 hours of sleep is best and some patients need more.

**Summary: Headache (Recurrent)**



**Abortive Treatment**

PARACETOMOL + tea or coffee + (if vomiting) PROCHLORPERAZINE  
 Aspirin or BRUFEN + PROMETHAZINE  
 CHLORPROMAZINE  
 DIPHENHYDRINE

**\*Prophylactic Treatment**

PROPRANOLOL  
 VERAPAMIL  
 AMITRIPTYLINE  
 NORTRYPTLINE  
 CARBAMAZINE

Must try for at least 1 month

**\*also give these patients abortive treatment!**



## Chapter #8-Back Pain

### Case Example

Joseph Ngandu is a 47-year-old man who comes to see you for back pain. He reports that back pain has been a problem for a long time, but recently it has begun to keep him from being able to work or sleep. He has not had any trauma and wants some medicine for pain relief.

### Discussion

Back pain is a problem for people all over the world. Usually, back pain is a “self-limited condition” meaning it will eventually get better on its own. No real harm (other than immediate pain and discomfort) results from self-limited conditions.

Since most back pain will get better on its own, your role as a medical provider includes two duties.

1. Make certain the back pain is not from a serious problem that needs further treatment. Problems that may need further care include TB of the spine (also called *Potts' Disease*) and fractures of the spine.
2. Once you have decided that the patient's back pain is not from an underlying disease that needs treatment, you can then provide the patient with medicines and advice to help them with the pain and discomfort.

### Key Points

Back pain can be due to many different problems. The most common cause of back pain is muscular aches and spasm. This can occur from straining and pulling the muscles either by lifting or pulling too much weight or from repeated movements, such as bending over in the fields. Pain is increased with movements and patients may even be able to point at the general area where the pain is greatest. Muscle aches and pains usually do not need any special treatment and go away in a few days.

Back pain can also result from bone problems such as fractures or bony disease. Bone pain can be severe and may be especially painful at night while the patient is trying to sleep. Bony pain can be limited to a small area of the spine and may be very severe.

Finally, back pain can be due to pressure on the nerves leaving the spinal cord on their way to the legs. This pressure may be caused by arthritis in the openings of the spine where the nerves exit. Discs can also squeeze nerve roots. Discs are soft cushions that lie in between each of the small bones (or *vertebra*) of the spine and discs can rupture open pushing nerves aside and causing pain that shoots down across the buttocks or legs.

Severe bone or nerve problems may squeeze the spinal cord causing the patient to develop weakness, numbness, difficulty walking and problems with *urination*. Permanent damage can occur. People with signs of spinal cord disease need to be referred to a doctor or hospital immediately.

### Questions to Ask

1. Has the patient had any recent trauma?  
Traffic accidents are a common cause of spinal injuries, but injuries can also occur working with animals or farm equipment. Try to establish if an accident caused the symptoms. Accidents suggest the possibility of a bony injury (fracture) that may need to be further evaluated. Simple strains and pulls from working are very unlikely to produce a fracture in healthy bones.

2. Does the patient have TB? Have they been losing weight or having other symptoms that suggest TB? Is anyone in their home being treated for TB?  
Patients who may have TB of the spine should be reviewed by a doctor and probably need x-rays.
3. Where is the pain located? In the back muscles? The spine? Does the patient have shooting pains into the buttocks or legs?  
Pain in the lower 1/3<sup>rd</sup> of the back is by far the most common muscle problem.
4. Does the patient have weakness or numbness?  
A line of numbness across the trunk with numbness expanded below the line suggests a spinal cord problem and needs to be reviewed by a doctor.
5. Does the patient notice problems with *urination*? Are they able to control their urine? Any problems with urination in people with back pain or trauma suggests a spinal cord injury.

## Examination

If someone comes complaining of back pain, it only makes sense to ask them to remove their shirt or other garment so you can see their back. Look for any obvious curve or bony abnormality? Bony abnormalities need to be referred to the doctor.

Ask the patients to point to the most painful place, then firmly press with a solid blow to each *vertebra* starting at the upper neck and traveling down the spine. Strike firmly, but not so hard that you would expect a painful response in a normal person. Is there any one spot or location that such a blow produces much pain? If this firm striking to the spine cause pain in one distinct region, this is called *point tenderness* and may indicate a bony problem.



You will not want to strike anyone with trauma to the back. If they have a fracture, you could cause even more damage.

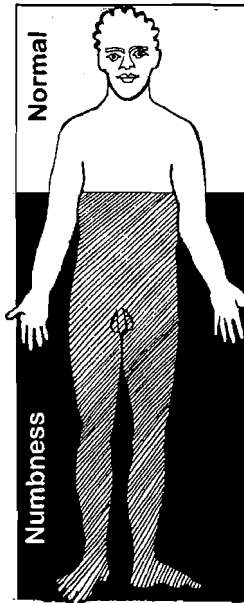
Perhaps one of the best things to do when you examine someone with back pain is to simply watch them walk. Are they limping? Can they do a deep knee bend (into a squat) and rise up? Ask them to stand and walk on their toes and their heels. If they can do all of these things, they are pretty strong.

If the person claims they do not have the strength to stand on their toes, lie them down and test the strength of individual muscles. Can you pull their legs off the bed? Can you detect weakness or a difference in between the two legs? Sometimes it can be hard to separate weakness from pain. When people are in pain, they may be reluctant to move at all. Try to encourage them to show you what they can do.

When you watch a patient walk, does he or she walk with a stiff gait? This may be important. If the walk seems stiff, try to move the legs with the patient lying flat. If there is stiffening, this is of some concern.

Be certain to check sensation, even if the patient claims there is no numbness. Is there numbness in one leg or one part of the leg? Is there numbness in both legs? Does the numbness include some part of the trunk? See if you can find a clear line where the sensation changes from normal to numb somewhere on the body as shown in the picture below.

The patient shown here has a line of numbness in the middle of his chest. Everything above the line feels normal. Everything below the line is numb.



### Problems to consider (*Differential Diagnosis*)

1. Minor strain (muscular pain)
2. Arthritis
3. Ruptured disc
4. *Potts' Disease* (TB spine)
5. Fracture of vertebra
6. Any problem causing *cord compression* (squeezing the spinal cord)
7. Cancer in the bones

Problems number 4-7 should be referred to a physician or hospital whenever possible.

### Management

For back pain from muscle strain and arthritis, several medicines can help relieve the discomfort. These include-

BRUFEN  
INDOCIN  
ASPIRIN

Remember that these medicines must be taken with food. If the patient has a long history of back pain and you think they may need to take the medicine for more than 7-10 days, there are special cautions listed in the DRUG FORMULARY. You may notice that PARACETOMOL is not listed. Although PARACETAMOL is a good pain medicine for other problems, it does not work very well for back pain in most people.

### Guidelines for follow-up

If the patient has back pain from simple muscle strains or arthritis, you can provide them with 7-10 days worth of medicine (as above) and instruct them to return to you if needed. Such patients will usually get better on their own even without medicines. Traditional healers may also be able to provide them with helpful treatments. If however, you suspect a ruptured disc (with *radicular* pain) causing nerve root

compression, you will need to see them every 1-2 weeks until their symptoms improve. Pain from a ruptured disc takes 6-8 weeks to heal (much longer than the pain of simple muscle strain). You will want to review these patients until their pain improves or stabilizes to make certain they do not develop signs of *cord compression*.

Other problems, such as bony pain, possible fracture from trauma, or new unexplained back pain with *point tenderness* suggesting Potts' Disease should be sent to a doctor for review and possible x-rays.

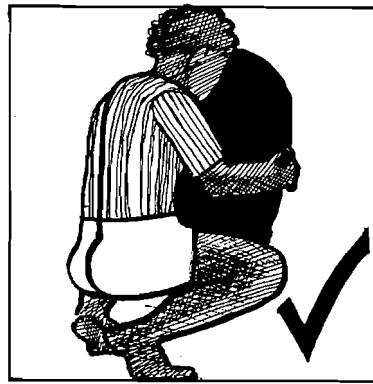
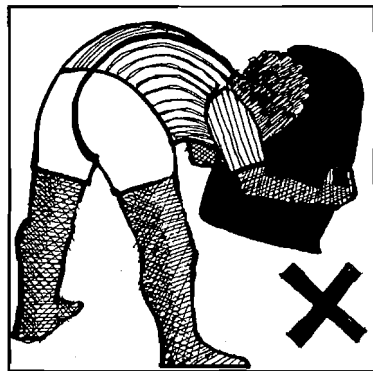
Weakness (even present when the patient seems to be giving their full effort), stiffening of the legs (spasticity), back pain with *urinary* problems or a line of numbness are all cause for concern and should be reviewed by a doctor.

## Other Actions

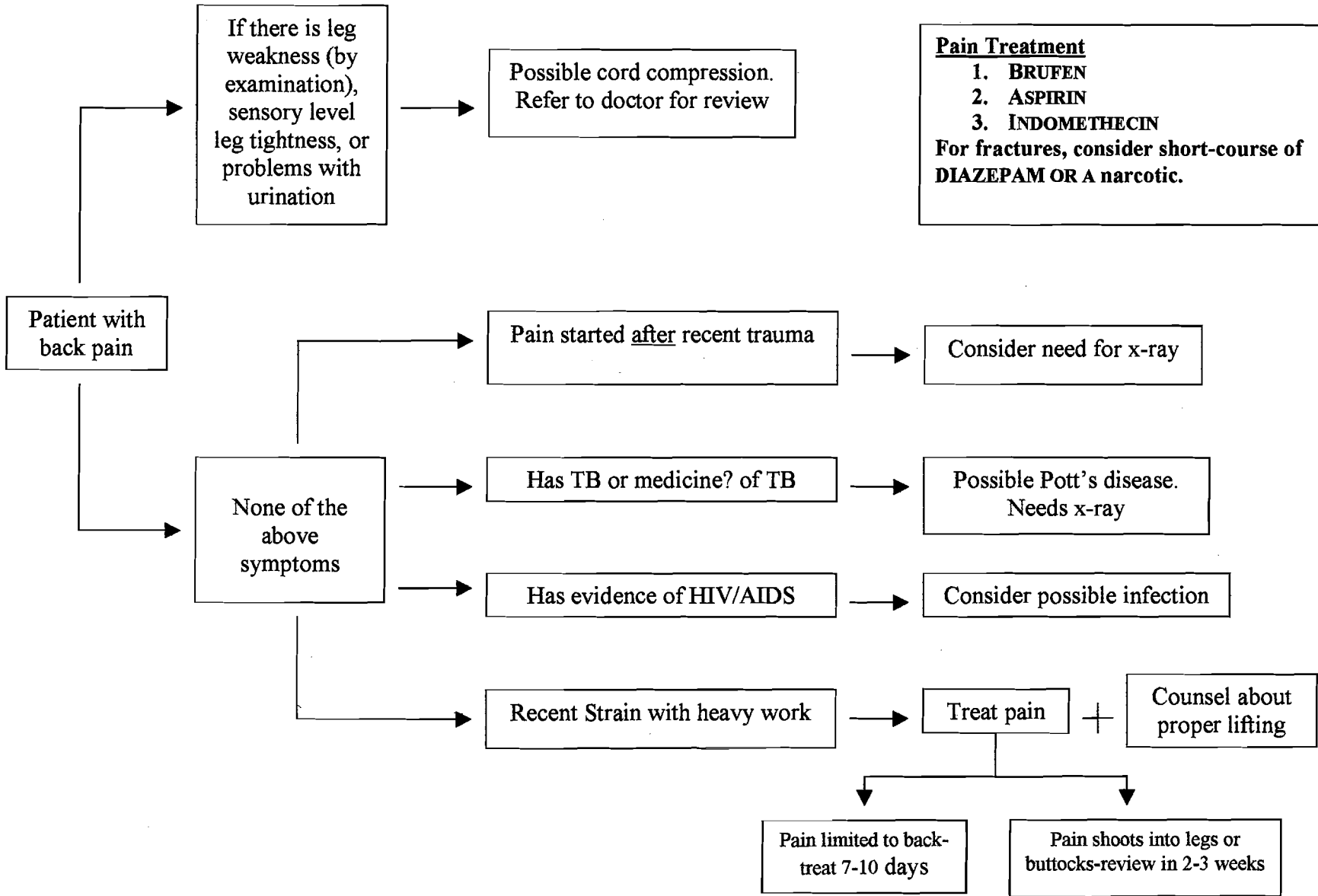
People with back pain from muscle aches and strains used to be sent to bed for days to weeks (called "bed rest") with the thought that such bed rest would help the muscles heal. After a great deal of research, it has been found the in fact, for most back pain, bed rest is a bad idea and may cause the patient to recover much more slowly! Most patients with back pain from a muscle strain need to avoid heavy lifting and frequent bending for 1-2 weeks. Otherwise, walking and other normal activities should be continued.

## Patient Education

If you see a patient who has frequent back strains and pain, you must take the time to educate the patient about proper lifting techniques. People, even small people, can carry very heavy loads. (What a small lady can carry on her head to market is impressive!) People with frequent back injuries are more likely to get hurt **lifting** not **carrying**. When heavy items are picked up, the person should bend their knees, grab the items with their hands, and then straighten the knees to lift the item...all the while keeping the back straight not bent! Bending over at the waist and using the back muscles to lift any item is asking for trouble!



**Summary: Back Pain**



**Pain Treatment**  
 1. BRUFEN  
 2. ASPIRIN  
 3. INDOMETHECIN  
 For fractures, consider short-course of DIAZEPAM OR A narcotic.

## Chapter #9-Neck Pain

### Case Example

Masha Kamwale is a 46-year-old female who comes to see you for neck pain. She reports that the pain has been bothering her for almost two weeks. She has pain radiating from her neck into her left arm and cannot turn her head without severe worsening of pain. She cannot sleep. She has never had this pain before and believes it began after she carried (on her head of course!) a particularly heavy bag of maize home from the market.

### Discussion

Neck pain can be very troublesome especially to women who are more likely to have neck pain and injuries related to carrying heavy loads on their heads. Neck pain that occurs after significant trauma or develops in the setting of chronic illness like TB or HIV/AIDS should be reviewed by a doctor who may get x-rays. Most neck pain will get better with time. As with back pain, your job is to decide if there is an underlying bone abnormality or if the spinal cord is getting squeezed because these problems may need to be referred to a doctor.

### Key Points

The most common cause of neck pain is muscular aches and spasm. Straining and pulls may result from carrying too much weight on the head. Neck injuries are also very likely to occur in traffic accidents. Head turning worsens the pain. Neck pain from simple muscle aches usually does not need any special treatment and go away in a day or two.

Neck pain can also result from bone problems such as fractures. Bone pain can be severe and may be especially painful at night while the patient is trying to sleep. The pain can be limited to a small area of the spine and still be very severe.

Finally, neck pain can be due to pressure on the nerves exiting the spinal cord on their way to the arms. This pressure may be caused by arthritis in the openings of the spine where the nerves exit. Discs can also squeeze nerve roots. Discs are soft cushions that lie in between each of the small bones (or *vertebra*) of the spine and discs can rupture open pushing nerves and causing pain that shoots across the shoulders into the arm.

As with all spinal injuries, severe bone or nerve problem can squeeze the spinal cord (called *cord compression*). Cord compression causes weakness, numbness, difficulty walking and problems with *urination*. Patients with cord compression can develop tightness in their legs that make it very difficult for them to walk. People with signs of spinal cord disease need to be referred to a doctor or hospital.

### Questions to ask

1. Has the patient had any recent trauma?

Traffic accidents are a common cause of neck pain. Accidents can cause a bony injury (fracture) that needs to be further evaluated. A doctor should review patients who experience numbness or weakness following trauma. Spinal injuries can worsen and cause permanent problems if they are not cared for properly. Simple strains and pulls from working are very unlikely to produce a fracture in healthy bones.

2. Does the patient have TB? Have they been losing weight? Do they have other symptoms that suggest TB?  
Do not forget the possibility of *Pott's Disease*. TB can travel to the spine and chew away at the bone. Again, TB and neck or back pain needs to be reviewed by a doctor.
3. Where is the pain located? In the neck muscles? Does the patient have shooting pains into the shoulder or arms? Does the patient have weakness or numbness?  
These symptoms can occur if a disc has ruptured.
4. Does the patient notice problems with *urination* or walking? Are they able to control their urine?  
Problems with urination or walking suggest a spinal cord injury and should be reviewed by a doctor.

## Examination

When you see someone with neck pain, ask him or her to point to the most painful place, then firmly press each *vertebra* starting at the lower back and traveling up the spine. Press firmly, but not so hard that you would expect a painful response in a normal person. Is there any one spot or location that this pressure produces much pain? If this firm pressure to the spine cause pain in one distinct region, this is called *point tenderness* and may indicate a bony problem.

Perhaps one of the best things to do when you examine someone with neck pain is to simply watch them walk. Can they do a deep knee bend (into a squat) and rise up? Ask them to stand and walk on their toes and their heels. If they can do all of these things, they are pretty strong. Can they move their legs quickly? Any sign of tightness in the legs or arms that keep them from moving their limbs quickly is cause for alarm.

Can they turn their head to both sides? This may produce pain especially with muscle strains. Sometimes it can be hard to separate weakness from pain. When people are in pain, they may be reluctant to move at all. Try to encourage them to show you what they can do.

Be certain to check sensation, even if the patient claims there is no numbness. Shooting pains into the arms, especially those worsened with head-turning suggest disc disease.

## Differential Diagnosis:

1. Minor strain (muscular pain)
2. Arthritis
3. Ruptured disc
4. *Potts' Disease* (TB spine)
5. Fracture of vertebra
6. Any problem causing *cord compression* (squeezing the spinal cord)

Problems number 4-6 should be referred to a doctor or hospital whenever possible.

## Management

For neck pain from muscle strain and arthritis, several medicines can help relieve the discomfort. These include-

BRUFEN  
INDOCIN  
ASPIRIN

Remember that these medicines must be taken with food. If you think the patient needs to take the medicine for more than 7-10 days, there are special cautions listed in the DRUG FORMULARY. You may notice that PARACETOMOL is not mentioned as a treatment for neck pain. Although PARACETOMOL is a good pain medicine for other problems, it does not work very well for neck or back pain.

A soft cervical collar is a neck brace that holds the head in one position. It may help relieve some neck pain and can sometimes be purchased or acquired through hospitals or large clinics. Unless the patient has a

fracture, a soft collar is not usually necessary. If the patient has a collar, suggest they wear this only for a few days or only when they sleep.

### Guidelines for Follow-up:

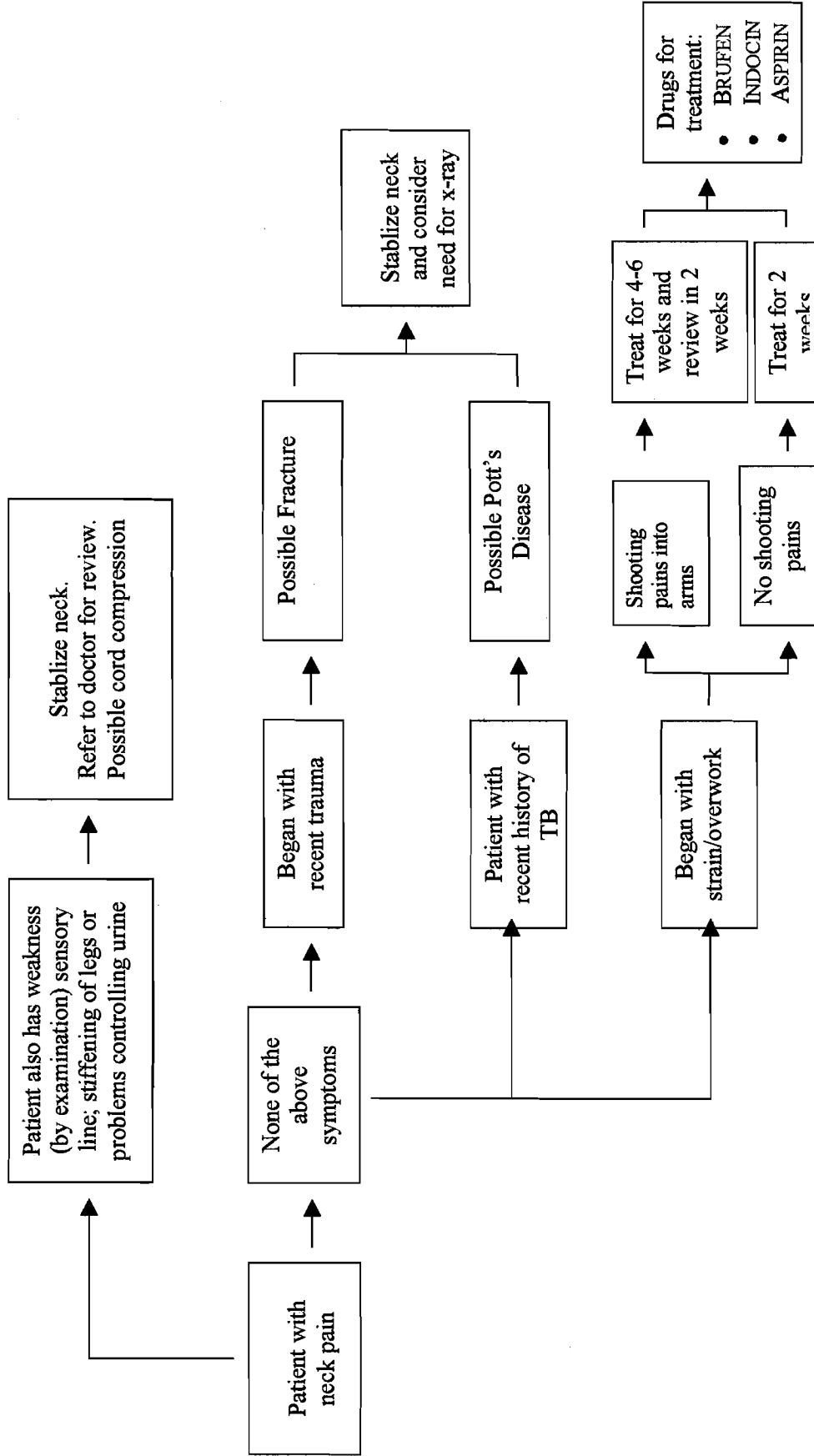
Patients with neck pain from simple muscle strain can be reassured and given 7-10 days<sup>4</sup> of pain relievers (see treatments). If the patient has *point tenderness* with weight loss, TB, or HIV/AIDS, you should try to refer them for review by a doctor. Patients with a stiff gait (tightening of the legs) or problems with urination also need to be reviewed by a doctor. Patients with shooting pains into the arm or neck pain and arm pain may have *radicular* pain and will require a longer period of recovery. For patients with radical pain, expect 4-6 weeks before the patient is feeling fully better. You should try to review these patients every 2 weeks or so during this recovery time to assure that they do not develop weakness, numbness, or any other problem that may need to be reviewed by a doctor.

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<sup>4</sup> If your pharmacy's supplies of these medications are very limited, you can try a 3-5 days course for people with less severe pain.



**Summary: Neck Pain**



## Chapter #10-The Slow Child



### Case Example

Felister Moongu is a 5-year-old child brought to clinic by his mother because of diarrhea. When you question the mother, the diarrhea has not been too severe and the child does not look dehydrated, but you notice that he seems slow to understand you and does not act like a normal 5 year-old child. He is underweight and short for his age too. He is not in school. When you question him, he speaks very little and his speech is that of a much younger child.

### Discussion

Children can have many different problems that cause them to develop slowly. Physical development can be slowed by illness or poor nutrition. The “Slow Child” can also be a child whose mental development seems to be slowed. We usually judge mental development by a child’s language and behavior, so any problems with language can also cause a child to appear slow, even if their mental functioning is actually normal.

Slow children are more likely to suffer from malnutrition and may have poor relationships with their parents and siblings who cannot understand why they are unable to work and play like other children. Slow children can also suffer from physical disabilities, which go unrecognized (such as weak or clumsy arms and legs). It is important for you to recognize the slow child.

First, you must recognize the slow child so you can see if there is any treatment for the child that will allow them to work and play. You can also identify other problems that can make their lives more difficult and try to treat these problems. For example, maybe the child has seizures. Parents are often reluctant to tell you that their child has seizures, but good medicines exist that can treat these and improve the life of the child. Educating the parents that their child has a real problem and needs extra attention and care may help. You can provide a great deal of guidance and support for the families of children who have slow development.

### Key Points

You probably already have an idea of what we mean by “The Slow Child”. This is the child who develops speech late and slowly. The slow child may not be able to play well with other children. Some children who are slow even look a bit strange with prominent eyes and an oversized tongue (often seen with *Downs Syndrome*) or really low set large ears and otherwise abnormal faces

Parents do not usually bring a slow child in to you and say, “My child is not thinking right and is not like the other children”. But you will see this child for other reasons. Perhaps, the child comes in for weight loss or diarrhea. The slow child is more likely to have “failure to thrive” but does well when he or she is in the hospital with supervised feeding. The slow child may come in with burns or injuries from falls that

occurred during a seizure. Again, parents may bring them in to you for care of their burns but never tell you that the child has seizures. You must ask.



Consider asking anyone who comes in with burns if they have fits or convulsions. Seizures are a common cause of burn injuries.

You may not be able to “fix” the slow child or make them completely normal, but you can offer help with individual problems, like seizures. Keep your eyes open for “The slow child”. They and their family need special help from you.

You may find that children with slow development come from difficult pregnancies or complicated deliveries, especially twins. If the mother had infections during her pregnancy or has thyroid problems (suggested by a large goiter) the child may be more likely to have developmental problems. Sadly, some children who are born healthy have developmental problems only after a severe infection, like cerebral malaria or *meningitis*. Very old mothers (who have children after they are 40 years old) are also more likely to have a slow child born to them.

Physical disabilities can be due to an early brain injury, trauma, or infection while still in the womb. Mental deficiency can also result from early infections and trauma. Thyroid problems in both mother and child can contribute to mental deficiency, too. Visual problems can result from cataracts or the child may simply need glasses. Hearing problems can be present from birth or can occur after infections, especially *meningitis*.

Finally, ask about the health of both parents. Children with HIV/AIDS can become slow even before showing other signs of disease (like weight loss or infections). If the mother or father has HIV/AIDS and the child is very slow for no clear reason, the child may suffer from HIV/AIDS.

## Questions to ask

1. First ask about the pregnancy of the mother while she carried the child. Was she ill? Did she suffer from any infections? Was the delivery of the child especially difficult? Were forceps required? Who assisted with the delivery? A doctor? A midwife? A nurse? A trained community health worker? Did the child take a long time after delivery to cry? Any problems of this nature can later cause the child to have developmental problem. Of course, most children do not have these problems even when mother was ill or infected during pregnancy.
2. How old is the mother?  
Very old mothers (those over 40 years when they deliver the child) are more likely to have children with *Downs Syndrome*. Children with *Downs Syndrome* are mentally slow with prominent eyes and tongue that seem too large for their mouths. These children may also have heart defects or other birth abnormalities.

Old mothers who have children with *Downs Syndrome* may need to be advised against having more children and offered some form of birth control (for example bilateral tubal ligation or oral contraceptives). There is a chance that other children born to her will have the same problem.

Below is illustrated the typical features of a child with *Downs Syndrome*.



3. Does the mother have evidence of thyroid disease? Does she have a large thyroid gland (a *goiter*)? If so, both the mother and child should be certain to use salt or sugar with iodine because a lack of iodine can worsen this problem.



4. Has the mother or father noticed any problems with the child's vision or hearing? Learning problems related to poor vision or hearing may be treated with glasses or hearing aids, but it is important that a doctor evaluates the child if possible.
5. Do the parents notice any particular problems with the child's movements of the legs or arms? Is walking a problem? Is the child able to use his or her hands effectively? These physical disabilities cause the child to be especially vulnerable to nutritional problems.
6. Did the child suffer an illness or injury early in life? What sort of injury or illness? Meningitis and high fevers can damage the hearing of a child and deaf children can appear slow because they are unable to hear speech (Imagine trying to learn how to talk when you can't hear anyone else speaking!).

## Examination

Look initially to see if the child's head seems unusually large (often due to hydrocephalus) or unusually small (microcephaly). Variations in normal head size often indicate early or ongoing brain damage.

Then, speak with the child. Does the child seem to understand you? Can they hear you? If they follow simple commands like "open your mouth", repeat the same command with your head turned or when you are standing behind the child. If the child can only follow commands when he or she is looking directly at you, they may have hearing problems.

If the patient can hear and understand you when you speak in a normal voice, can they also hear softer tone? Try whispering and see if their hearing still seems normal. For children too young to follow commands, try calling to them from across the room and seeing if they turn their head toward you.

Now check to see if the child has reasonable vision. Move a bright colored object around. Can they follow it? Can they still follow it when it is further across the room?

Does the child appear unusual (*dysmorphic*) like a child with *Downs Syndrome*? Does he or she have any unusual features of note?

Try to decide if the child is a slow talker, slow walker or slow in general. Are there any obvious physical problems? Is the child less able to use one side of the body? Is one side of the body or one arm or leg smaller than the other appearing wasted and weak? This may indicate *cerebral palsy* or *paralysis* from an early brain injury.

As usual, a full neurologic examination is ideal. These are a few specific things to consider. Developmental milestones can also help you determine if a child is slower than we expect for a normal child.

**Developmental Milestones**

<b>Age</b>	<b>Gross motor</b>	<b>Visual-motor/problem solving</b>	<b>Language</b>	<b>Social/adaptive</b>
1 mo	Raises head slightly from prone, makes crawling movements	Birth: visually fixes 1 mo: has tight grasp, follows to midline	Alerts to sound	Regards face
2 mo	Holds head in midline, lifts chest off table	No longer clenches fist tightly, follows object past midline	Smiles socially (after being stroked or talked to)	Recognizes parent
3 mo	Supports on forearms in prone, holds head up steadily	Holds hands open at rest, follows in circular fashion, responds to visual threat	Coos (produces long vowel sounds in musical fashion)	Reaches for familiar people or objects, anticipates feeding
4 mo	Rolls front to back, supports on wrists and shifts weight	Reaches with arms in unison, brings hands to midline	Laughs, orients to voice	Enjoys looking around environment
5 mo	Rolls back to front, sits supported	Transfers objects	Makes sounds and orients to bell (localizes laterally)	
6 mo	Sits unsupported, puts feet in mouth in supine position	Unilateral reach, uses raking grasp	Babbles	Recognizes strangers
7 mo	Creeps	7-8 mo: inspects objects	Orients to bell (localized indirectly)	7-9 mo: finger feeds

<b>Age</b>	<b>Gross motor</b>	<b>Visual-motor/problem solving</b>	<b>Language</b>	<b>Social/adaptive</b>
8 mo	Comes to sit, crawls		Babbles	
9 mo	Pivots when sitting, pulls to stand	Uses pincer grasp, probes with forefinger, holds bottle, throws objects	Babbles, gestures, waves bye-bye, understands "no" 10 mo; orients to bell (directly) 11 mo: follows 1-step command with gesture	Starts to explore environment; plays gesture games
12 mo	Walks alone	Uses mature pincer grasp, releases voluntarily, marks paper with pencil	jargoning (runs several unintelligible words together) 13 mo: uses 3 words 14 mo: follows 1-step command without gesture	Imitates actions, comes when called, cooperates with dressing

15 mo	walks backwards	Scribbles in imitation,	Uses 4-6 words 17 mo: uses 7-20 words, points to 5 body parts, uses mature jargonizing (includes intelligible words in jargonizing)	15-18 mo: uses spoon, uses cup independently
18 mo	Runs, throws objects from standing without falling	Scribbles spontaneously,	Uses 2-word combinations 19 mo: knows 8 body parts	Copies parent in tasks (sweeping, dusting), plays in company of other children
21 mo	Squats in play, goes up steps	Builds tower of 5 blocks	Uses 50 words, 2-word sentences	Asks to have food and to go to toilet
24 mo	Walks up and down steps without help	Imitates stroke with pencil, builds tower of 7 blocks, turns pages one at a time, removes shoes, pants, etc.	Uses pronouns (I, you, me inappropriately), follows 2-step commands	Parallel play
30 mo	Jumps with both feet off floor, throws ball overhand	Holds pencil in adult fashion, performs horizontal and vertical strokes, unbuttons	Uses pronouns appropriately, understands concept of "1," repeats 2 digits forward	Tells first and last names when asked; gets self drink without help



Age	Gross motor	Visual-motor/problem solving	Language	Social/adaptive
3 yr	Can alternate feet when going up steps, pedals tricycle	Copies a circle, undresses completely, dresses partially, dries hands if reminded	Uses minimum 250 words, 3-word sentences; uses plurals, past tense; knows all pronouns; understands concept of "2"	Group play, shares toys, takes turns, plays well with others, knows full name, age, sex
4 yr	Hops, skips, alternates feet going down steps	Copies a square, buttons clothing, dresses self completely, catches ball	Knows colors, says song or poem from memory, asks questions	Tells "tall tales," plays cooperatively with a group of children
5 yr	Skips alternating feet, jumps over low obstacles	Copies triangle, ties shoes, spreads with knife	Prints first name, asks what a word means	Plays competitive games, abides by rules, likes to help in household tasks

### Possible Causes (*Differential Diagnosis*)

A child can appear slow for many reasons-

1. *Physical disability*-such as weak legs (*paraparesis*) or weakness on one side of the body (*hemiparesis*)
2. *Mental deficiency*-sometimes called *mental retardation*
3. *Visual problems*-ranging from blindness to problems moving the eyes
4. *Hearing problems*- from complete deafness to problem hearing soft conversation
5. *Hydrocephalus*-fluid collecting around the brain should be referred to a physician for review
6. *Microcephaly*-may indicate brain damaged
7. Difficult labor-very difficult labor can cause brain damage by lack of oxygen or brain hemorrhage



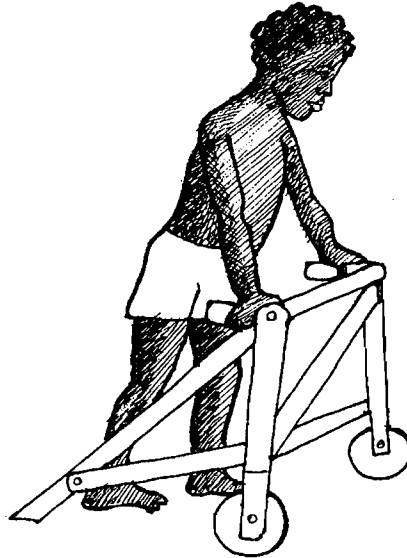
Remember-hearing and visual problems are easy to miss if you don't look closely

### Management

If you think a child has developmental problems related to hearing loss, refer them for review by a doctor. Some devices for the child to use for better hearing can even be made in the village. Encourage parents to use simple signs or motions with their hands to communicate with child.

If you think a child has problems related to visual problems, refer them for review by a doctor. Some hospitals have glasses that can be distributed for little or no cost.

For children with mental disabilities, try and determine if there are any other problems. Epilepsy often occurs in such children and needs treatment. These children may also need referral to a nutrition center or the Maternal and Child Health Center.



For children with physical disabilities, consider referring them for review by a doctor or physiotherapist. Physiotherapists can make crutches or other items that help these children to function more normally. Referral to a nutrition center can also be very helpful if the child seems to have recurrent problems with malnutrition.

## Guidelines for Follow-up

Children with developmental problems and disabilities are more likely than normal children to develop malnutrition and other health problems. You should try and evaluate them periodically to make certain they are gaining weight and growing. The mother may need extra encouragement because slow children can be difficult children to provide for. Referral for review by a doctor may be helpful, but these families and children benefit most by having a healthcare provider in their own community monitoring the child.

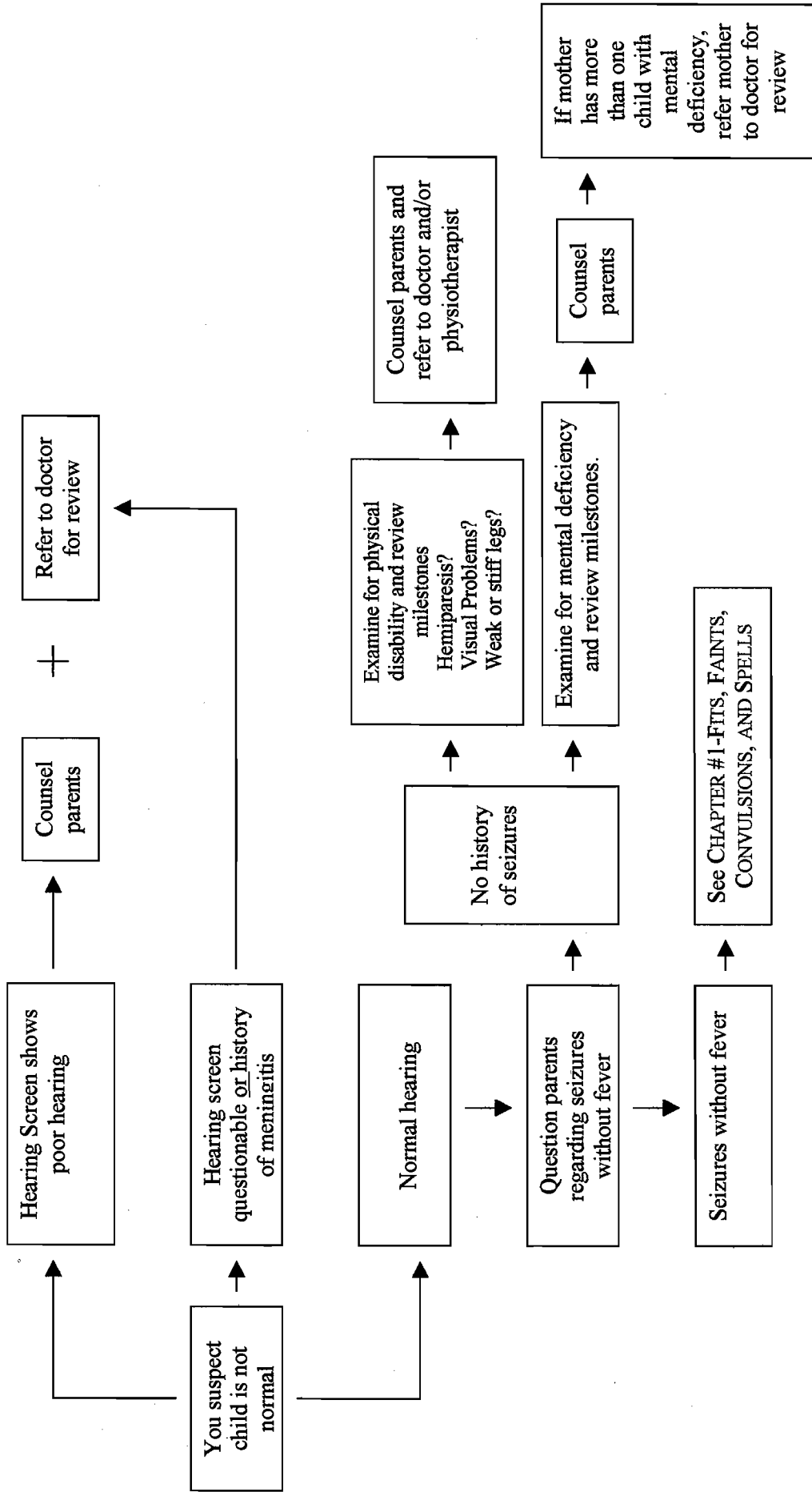
## Other Actions

If a mother has had more than one child with a physical or mental disability, she should be referred to a physician with a note from you explaining your concerns. There may be a problem the mother has that can be corrected with medicines. She may have underlying health problems that need to be addressed before she has any more children.

## Patient and Family Education

An experienced mother generally already recognizes that her child has a problem before you see the child. But if she believes little can be done to help her child, she is unlikely to seek care. Educating the patient may be the most valuable care you provide to children with learning disabilities and mental deficiency. The child needs to be followed periodically, but if you do not educate the parents to understand this child's special needs and limitations, little will improve. Parents may be frustrated with the child or reluctant to admit that there is even a problem. You cannot force them to accept information they do not want, but you can provide advice. It is important not to drive the parents away. The child will only be brought back for review if the parents are agreeable, and these children need your help. Be supportive of the families of these children. Having a child with special needs can be very difficult.

**Summary: The Slow Child**



## Chapter #11-Acute Paralysis

### Case Example

Florence Simoonga is an older lady (no one is quite sure of her birthday but her grandchildren are adults). The family brings her to you because she has developed sudden weakness on the right side of her body. She is unable to move the right side of her body at all. Even her face droops on the right. They had to carry her to your clinic. She was fine last night. They found her like this today.

### Discussion

Sudden paralysis can be of many different types-

1. *Hemiparesis*-weakness on one side of the body often involving the face, arm and leg. Sometimes the arm and leg on one side and the face on the opposite side will be affected. Florence has *hemiparesis* on her right side.
2. *Paraparesis*-weakness of the legs only with normal arm strength
3. *Quadriparesis*-weakness of all the limbs. This is rare.

In general, if someone has suddenly become paralyzed, you should refer them to the nearest hospital or clinic as quickly as possible. Unfortunately, transfers can take a long time and you need to know how to care for the patient while you are waiting for the doctor or ambulance to arrive.

This chapter will discuss what the problem may be and how you can treat the patient immediately. Patients with acute paralysis usually need more care than you can give in your clinics and you should try to refer them for hospital care if possible.

### Key Points

Patients with acute paralysis have a problem in the brain or spinal cord. It is important to determine if there was any trauma. If a back, neck or head injury preceded the paralysis, treatment at the hospital will be very different. Ask whoever brings the patient to you very careful questions to decide if the paralysis could be related to trauma.



Clear notes provided by you to the hospital doctor are extremely important

Try to determine if the patient has been ill for some time. Was this really paralysis that came on suddenly or has the patient been getting slowly weak for a long time? This chapter only addresses acute paralysis.

### Questions to ask:

1. When was the patient last feeling well?  
Remember, this chapter only discusses care for acute paralysis, but patients with paralysis all likely need to be reviewed by a doctor.
2. Has there been any trauma to the patient, especially injuries to the head, neck or back?
3. Does the patient have other known problems? Has the patient ever had high blood pressure (*hypertension*) or a heart murmur?  
*Hemiparesis* in patients with high blood pressure or heart disease is often due to *stroke*.
4. Has the person been ill recently with weight loss or fevers?  
Infections in the heart, brain or spinal cord can cause acute paralysis.

5. Did the weakness really develop suddenly or has the patient been stumbling and complaining about foot or leg pain for a few days?

Guillain Barre Syndrome causes weakness beginning in the legs and slowing over a few days ascending until the victim cannot walk or move their arms. If you see someone who has rapidly developed weakness, try to send them to the nearest hospital!

## Examination

Examine the patient's *level-of-consciousness*. Determine if the patient is awake and normal, lethargic, or comatose.

Look for evidence of recent head, back or neck injuries. Closely examine the scalp, back and neck for bruising.

Determine where the weakness is and classify it as *hemiparesis*, *quadriparesis*, or *paraparesis*. Is the patient weak and numb or just weak?

Does the patient have any movement in the affected limb(s) or are they completely paralyzed?

See if the patient can speak and swallow. Does the speech sound normal? Is the patient breathing normally?

Listen for a heart murmur. Check to see if the patient has a fever.

## Problems to Consider (*Differential Diagnosis*)

Sudden paralysis is usually due to one of a few things-

1. Stroke-Older patients, patients with diabetes, hypertension, sickle cell disease, or people who have had rheumatic heart disease (and heart murmurs) are especially likely to have strokes. These problems all effect the blood and blood vessels to the brain. Strokes occur when the blood flow is blocked-like a clogged pipe! Strokes usually cause a *hemiparesis*. Young people with rheumatic heart disease can also get infections in the heart valves that cause strokes.
2. Brain injury-Patients with head injuries can have bleeding into the brains. The paralysis can occur even several hours to days after the injury. In old people, the injury does not have to be very serious.
3. Spine injury-Injuries to the neck can cause *paraparesis* or *quadriparesis*. Injuries to the lower back can cause *paraparesis*.
4. Infections-Children are susceptible to infections like polio or post-infectious (meaning after the infection) problems like Guillain Barre Syndrome. This problem usually causes paralysis in the legs and can continue to worsen for many days. Weakness may even travel upward from the legs to cause problems with arm movement and breathing.
5. Polio-This disease can be prevented by vaccination, but in regions with political unrest vaccination campaigns have suffered and the disease continues to occur. Consider polio in any case of acute flaccid paralysis not obviously due to a brain or spinal cord injury. especially in a child. Your own country may have reporting programs.

## Management

People with acute paralysis really need to be cared for in a hospital by a doctor if at all possible. While you are waiting for them to be transported to the hospital, or waiting for the doctor to see them, there are a few things you can do.

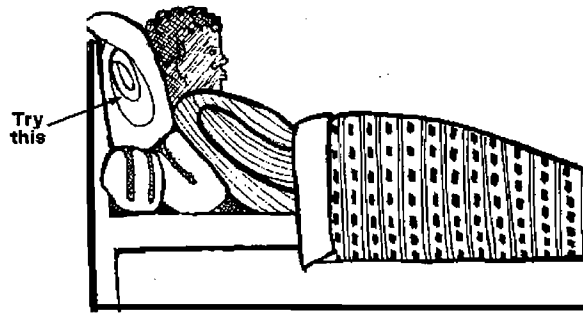
If the patient had a neck or back injury causing the paralysis-  
Lie them flat on a hard bed or board and stabilize their head so it does not move. You can do this with strips of tape and any rigid item like glass coke bottles. Do not move their head or neck at all. Movement can worsen the injury.



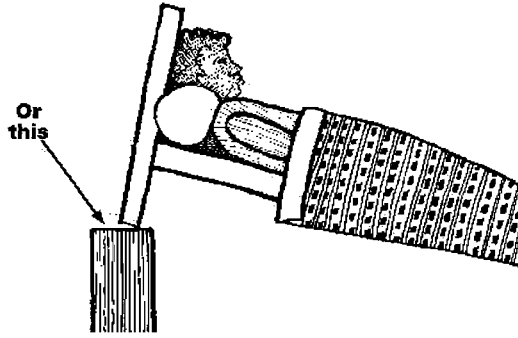
Keep them quiet and give them sips of ORS only (no meals) unless it will be more than 2 days until help arrives. Their neck and head should not be moved.

If the patient has a back injury-  
Place them on a hard bed or board and try to keep them lying flat. Give them PARACETOMOL for pain (avoid ASPIRIN or BRUFEN<sup>5</sup>). If they are unable to *urinate*, they can develop severe abdominal pain. If the abdomen appears swollen from a full bladder, you may need to place a catheter to empty the bladder.

If the patient has had acute *hemiparesis*-  
Place the patient in bed with his or her head elevated. You can elevate the head with pillow, a rolled up blanket, or by placing blocks under the legs at the head of the bed. The patient's head should be elevated as shown below-

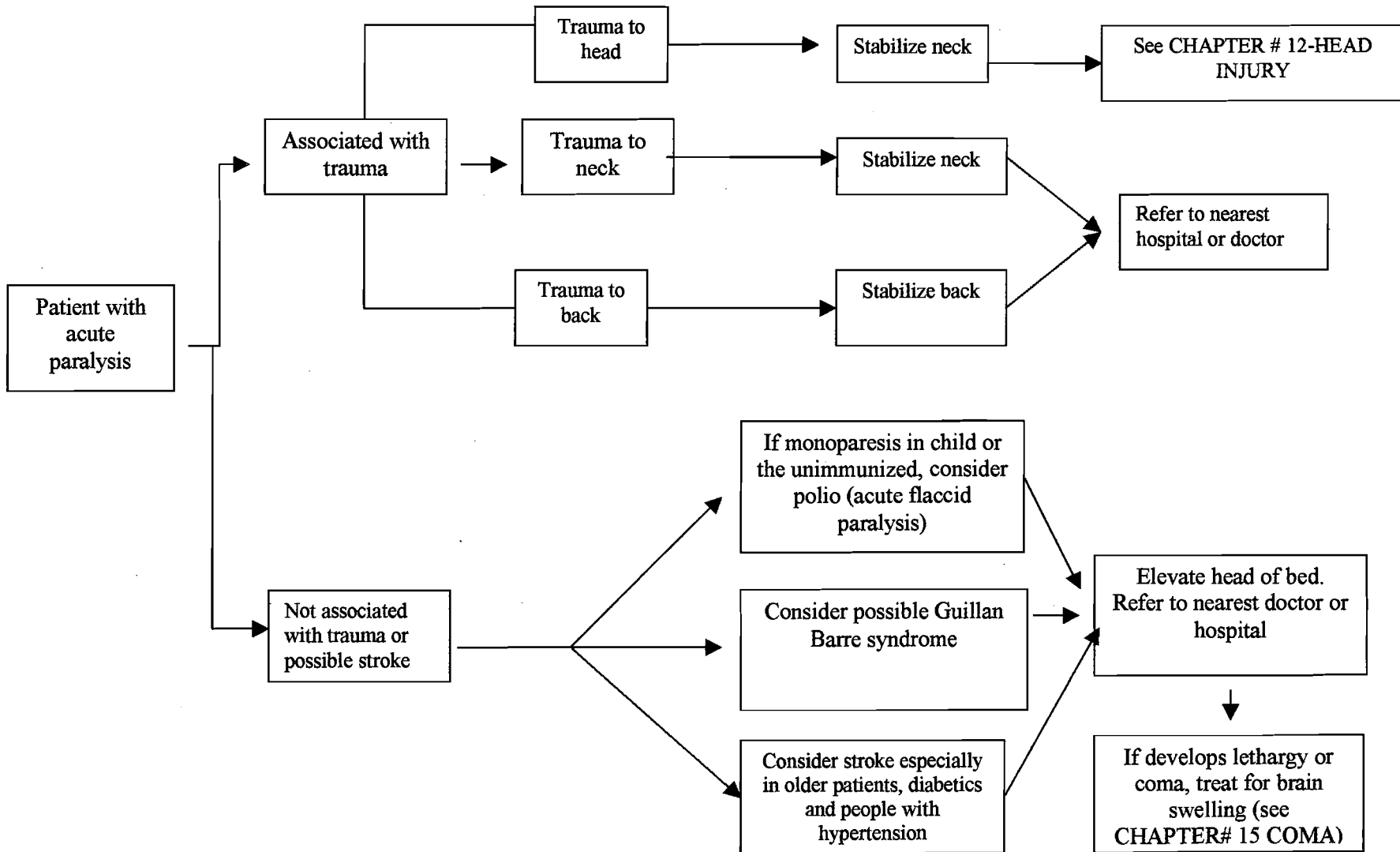


<sup>5</sup> These medications keep blood from clotting and can worsen any bleeding in the brain—bleeding you will not be able to see simply by looking at the patient!



If the patient is having trouble speaking and swallowing, do not give them food by mouth. Offer them water only if it will be more than a few hours before help arrives. If the patient appears dehydrated but cannot swallow safely, consider giving them fluids (for example, ORS) by *nasogastric* tube. See APPENDIX 2 for instructions on how to make your own ORS.

### Summary: Acute Paralysis





## Chapter #12-Head Injuries

### Case Example

Raphael Moongu is a 33 year-old man brought in by his family after being kicked on the left side of his head by an ox. The family tells you that he was knocked unconscious but awoke quickly. After the accident, he complained of headache and blurry vision and had at least two spells of vomiting. He laid down to take a nap and could not be woken up. The family brought him in immediately.

### Discussion

People who experience a severe head injury represent a neurologic emergency. Such injuries can occur from traffic accidents, farming accidents, falls, or assaults. You must act quickly to prevent death or permanent injury to their brain. The skull protects the brain. When injuries happen to the brain, the skull may have a fracture or may appear intact. If someone is unconscious after head trauma, even if the skull is intact, they probably have a significant injury.

When the brain is injured, it usually swells. Sometimes there is even bleeding inside the brain. When this happens, the skull actually prevents the brain from swelling freely and the brain tissue gets further injured as it try to swell into the small space provided by the skull. This swelling may kill the patient if neurosurgical help is not available quickly.

Raphael probably suffers from bleeding onto the surface of the brain from a large *artery* just under the skull over the ear. He should be transferred immediately to the nearest hospital and need to have the blood drained.

Your job in caring for patients with head trauma is to keep the brain swelling under control until more help can arrive or the patient can be transferred to a hospital. There are many ways to reduce brain swelling. No matter what type of head injury a patient has had, if they are unconscious or developing weakness on one side of the body, and are confused, decreasing brain swelling is an important treatment.

### Other Key Points

When people suffer a blow to the head hard enough to knock them unconscious, it is important to consider whether or not they might also have a neck injury. Neck injuries happen frequently with head injuries of this type.

People with head trauma may bleed a great deal from the scalp. Sometimes the blood even gets trapped in the layers of skin and tissue covering the skull. Children can bleed enough from their scalp to die. If someone has a scalp wound that is bleeding heavily, you will have to apply pressure or possibly even place temporary sutures to stop the bleeding before you can transfer them safely. Blood loss can cause the blood pressure to drop and this is disastrous for patients with head trauma.

Sometimes in very old people, it takes only a small blow to the head to cause bleeding around the brain. The fragile blood vessels most likely to bleed in very old patients are veins and veins bleed more slowly than arteries. Unlike Raphael, people with bleeding veins in the brain often do not lose consciousness when the injury occurs. With *venous bleeds*, the headaches may not begin for a day or two after the accident. You need to consider this type of bleed (*a subdural*) when old people come in with a new headache. Weakness can develop over days and weeks in patients with venous bleeds.

## Questions to ask

1. Ask about the accident and whether the patient lost consciousness is very important. If the patient did not lose consciousness and is not very old, they will probably be ok. If they lost consciousness, you will want to have some idea of how long they were unconscious. Were they unconscious for a few seconds? A few minutes? Many minutes? The longer they were unconscious, the greater the chance that a significant head injury occurred.



Be certain to write this information down and send it with the patient if they go to hospital.

2. Did anyone observe seizure activity after the accident? If yes, has the patient been awake at all since the seizure?  
If the patient had a seizure and has not woken up, consider *status epilepticus* (SEE CHAPTER #12-MANY SEIZURES).
3. Is the patient complaining of neck pain?  
If so, you must stabilize the neck until an x-ray is available. Do not *extend* or *flex* the neck until it has been x-rayed and you are certain the neck is not fractured.



## Examination

Some level of confusion after even a mild head injury may be expected. If the patient is very confused or unable to recognize family or friends, then they may have suffered from a serious injury.

If the patient is unconscious, pull their eyelids up and examine the pupils. Are the pupils the same size? If the pupils are different sizes, there may already be swelling in the brain and you will have to act fast. Are the eyes in the center when the head is facing forward? If the eyes are off to one side in an unconscious patient this indicates either a severe injury or possibly seizures.

Try to examine the patient's strength. If they cannot follow commands, observe closely how they move. Is one side of the body moving less than the other? If one side of the body is moving less than the other, this suggests a *hemiparesis*. This patient will need to be treated for brain swelling and sent to a hospital for further care.

If the patient is unconscious, does he or she pull away when you pinch their fingers and toes? If the patient does not pull away on one side, there may be head or neck injuries. Protect the neck and begin treatment for brain swelling. Then seek medical care from a doctor or hospital.

## Other possible problems (*Differential Diagnosis*)

Obtaining a history of the accident from a witness is critical to assure that you are not missing other problems. People in motor vehicle accidents can have chest and abdominal injuries in addition to head

injuries. All trauma victims need a very thorough head-to-toe examination to identify all possible injuries. If the patient is unconscious from bleeding into the abdomen, treating them for brain swelling will do little good. In an unconscious patient with no clear history of head trauma and no evidence of bruising, swelling or cuts to the head, you will need to consider other causes of coma (SEE CHAPTER #13-COMA).

## Management

People with head trauma may have several other injuries, too. A quick assessment of the “ABCs” (airway, breathing, circulation) is always in order. Make certain they have a clear airway, check blood pressure and stop any significant breathing. Assure that you are not missing any evidence of abdominal trauma or other serious injuries. Remember that large wound, puncture wounds or “dirty” wounds should be treated within a couple of days with tetanus vaccinations if this is available in your clinic or a nearby hospital.

If a patient is not unconscious, has no focal weakness, and did not experience a loss of consciousness at the time of the injury, you can reassure them and offer some pain medication for discomfort with follow-up in 1-2 days.

If the patient lost consciousness after head trauma, but is now awake and otherwise normal, you should still consider keeping them for observation. Watching the patient for 24 hours to assure that no brain swelling is going to occur is critical. While observing the patient, follow the Head Injury Observation Instructions in the table below. If you cannot keep them in the clinic or infirmary overnight, give the family clear instructions for “Head Injury Observation”. Do not send the patient who has had a significant loss of consciousness home with family members if you are unsure that the family can follow these instructions. It is best if you carefully document what is found during the observation period, especially if different staff members will be caring for the patient.



A HEAD INJURY OBSERVATION SHEET (shown in APPENDIX 3, page 123) can help. It is easy to make and use in your own clinic.

### **Head Injury Observation (for 24 hours after trauma)**

<b>Vomiting</b> -intractable vomiting is a warning of brain swelling, especially if the vomiting is <i>projectile</i>
Allow the patient to rest in a quiet dark room, but <b>awaken them every 2 hours</b> . Ask them simple question-where are they? How do they feel? If they do not awaken easily or become progressively more difficult to awaken, there may be brain swelling.
When you awaken the patient, <b>re-examine them including taking vital signs</b> . Can they answer question? Stay awake? Follow commands? Is there any evidence of developing weakness?
In <u>infants</u> - <b>Watch their fontanel</b> . If it begins to bulge, be concerned about swelling.

If the patient is unconscious, has focal weakness, or appears sleepy or confused, you should begin treating them for brain swelling and try to arrange a transfer to a hospital.

If there is any suggestion of *seizure*, begin treatment with DIAZEPAM and PHENOBARBITONE. Seizures are suggested if-

1. You see clear *tonic clonic movement*
2. A seizure was witnessed at the time of the accident and the patient is still not awake.
3. When you examine the patient, their eyes are deviated to one side.

## <sup>6</sup>Treatment for Brain Swelling-

Keep the patient in bed with the head of the bed elevated at 45 degrees
Give diuretics-FUROSEMIDE. Be prepared for a great volume of urine to follow. If injectable diuretics are not available, consider giving pills by rectum or placing a nasogastric tube if available.
Treat with PHENOBARBITONE and DIAZEPAM if there are any concerns regarding seizures.
Give PANADOL (not ASPIRIN or BRUFEN) for fever. ASPIRIN and PROFEN may cause any bleeding in the brain to worsen. Again, do not place pills in the mouths of patients who are not awake. Rectal dosing or nasogastric tubes may be needed.
If you have a bag and a mask to ventilate patients, then this can be the most effective way to decrease brain swelling quickly. This is only helpful, however, if you can continue to ventilate the patient all the way to the hospital.
If IV fluids are being used, avoid high glucose fluids. Ideally, use normal saline to maintain the blood pressure and hydration (although keeping the patient slightly dehydrated is good with brain swelling as long as the blood pressure is not compromised). High glucose levels will actually worsen brain swelling.

## Guidelines for follow-up

Patients who do not lose consciousness, or are only unconscious for a few seconds, may have a mild *concussion*. If their examination is normal, you may decide to let them go home. Be certain to review them again in clinic in 1-2 days. Most will get completely better within a week. A few patients with mild concussion will go on to develop chronic headaches and memory problems. Their families may even report a change in personality. This is called *post-concussive syndrome*. If the patient still complains of headache one month after mild trauma, you can try some of the *prophylactic* treatments for migraine (SEE CHAPTER # 5-RECURRENT HEADACHES).

## Other Actions

Head injuries can cause long-term problems for patients and the families that must care for them. The poor state of the vehicles on the roads results in many accidents and are the greatest cause of head injuries in most of Africa. Encourage your patients to wear seat belts when they are available in the vehicles.

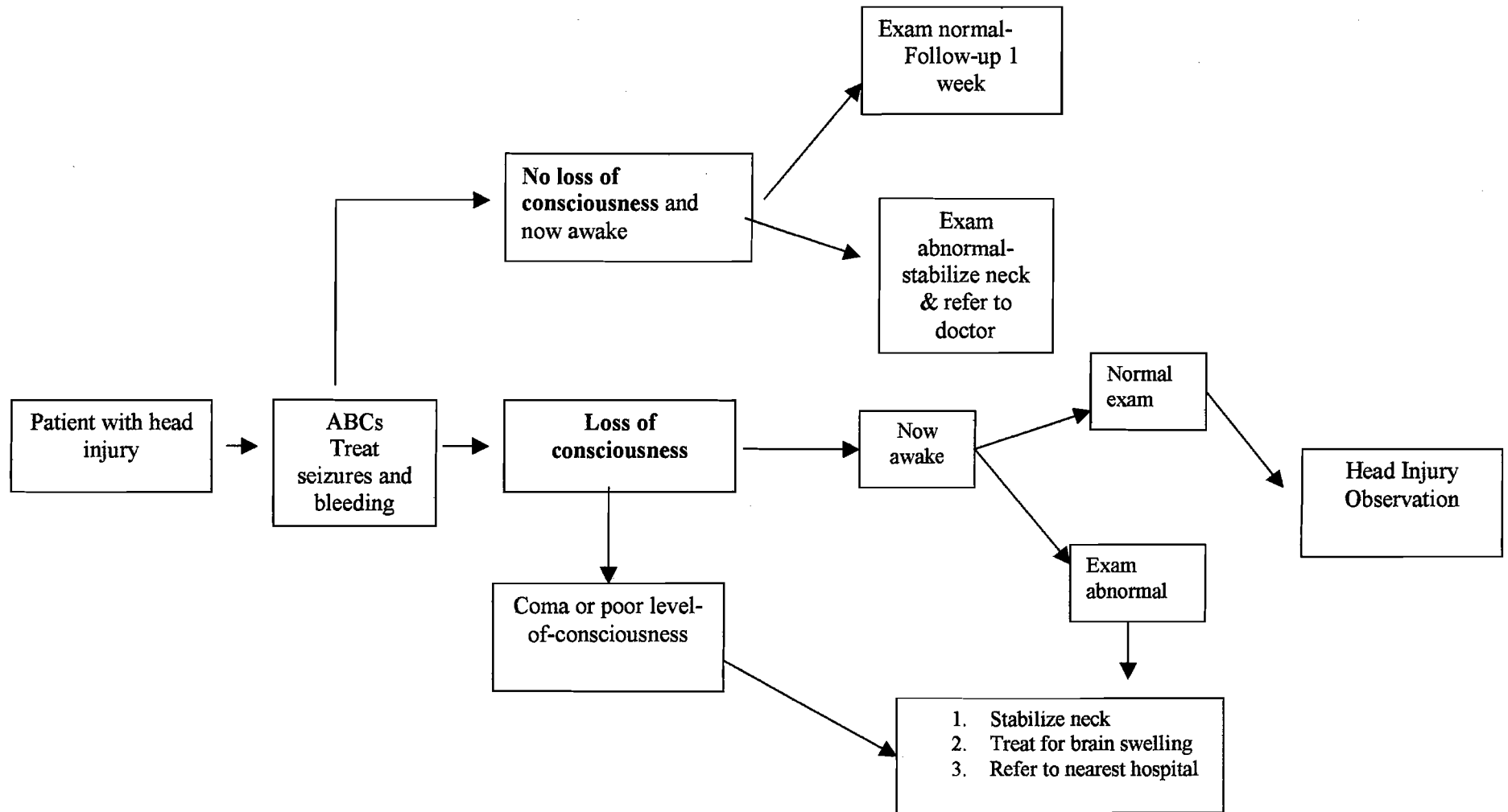


Also, try to be an advocate in your community for safety. Drunkenness and violence are major causes of head injury.

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<sup>6</sup> If the patient is not fully awake, do not try to give food or pills by mouth.

### Summary: Head Injury



**\*If multiple seizures, stabilize C-Spine and begin treatment for status epilepticus. SEE CHAPTER #14-MANY SEIZURES**

## Chapter #13-Cerebral Malaria

### Case Example

Chwende Mutinta is a 2 ½ year old boy brought in from a distant village by his mother unconscious with a very high fever. Chwende appears dehydrated and the mother says Chwende has not suckled well for at least 2 days. She reports “body hotness” for 2 days and this morning he had a convulsion. On the way to clinic, the child lost consciousness. You are already very busy in clinic. The rains ended a couple of weeks ago and malaria is very bad this year.

### Discussion

If you live in a region that has malaria year round (called an *endemic* region for malaria), then you have already seen cerebral malaria. If malaria is less common in your location and only occurs during a particular time of year, cerebral malaria may not be as familiar to you. You need to be able to recognize cerebral malaria because it is a great killer of children.

Cerebral malaria occurs when the malarial parasite concentration gets so high that the parasites cause sludging of blood vessels and swelling in the brain. Cerebral malaria in *endemic* regions is limited primarily to children, but among whites and Africans from regions with less malaria, even adults can succumb to cerebral malaria. When adults develop malaria, they may show signs of black water fever.

*Three important points to consider when you encounter cerebral malaria in children are-*

1. Children with malaria often have very low sugar levels in their blood especially if they have not been eating for the last 1-2 days. Be certain that you check a sugar level, observe the child consuming breast milk or some sweet drink (for example, ORS, juice), or administer IV glucose at the same time that you give quinine. Low sugar levels are very dangerous for the brain.



When giving IV QUININE, always give in an IV fluid containing sugar (such as D5).

2. Seizures with cerebral malaria can cause many other problems. Be certain to treat seizures as you treat the malarial infection. If the child has had a single seizure but is still unconscious, it may be worthwhile to have DIAZEPAM available and prepare to begin PHENOBARBITONE.
3. Besides treating malaria, you will need to also try to treat the underlying brain swelling but you will do this differently than described in the CHAPTER #10-HEAD INJURY. People with cerebral malaria are already very dehydrated. Do not give them diuretics such as FUROSEMIDE, keep their head elevated.
4. If you live in a region with much malaria, then all children who present with coma and a fever should be treated for malaria until a blood smear has been taken. BUT if the smear is negative or the child has neck stiffness (*meningismus*), you must consider the possibility of *meningitis*. Treat these children for both malaria and meningitis and transfer them to a doctor who can complete the tests needed (usually a *lumbar puncture*). SEE CHAPTER #4-HEADACHE (ACUTE) for help in treating *meningitis*.

### Other Key Points

Infants and the very old may not have a fever with cerebral malaria. In fact, these weak patients can have *hypothermia* (a lower than normal body temperature). In the very young and very old, low body temperatures are just as concerning as high body temperatures.

### Questions to ask

Try to establish how long the child has been sick and when the child became unconscious.

Also specifically ask if the child had any fits or convulsions before coming to hospital. If so, you should examine for signs of *subtle seizures* and treat with DIAZEPAM.

Ask if the patient has been receiving any medicines at home. If the child has been taking oral CHLOROQUINE at home and developed cerebral malaria anyway, it is unlikely that CHLOROQUINE alone will be able to cure the child.

Be certain to establish that the coma was not related to trauma or the ingestion of poisons. Review CHAPTER #13-COMA if needed.

## Examination

The examination of the comatose patient should be thorough but rapid. Sometimes you may begin examining the patient while the family is still telling you the history. Time is critical.

Most specifically, you want to know what their vital signs are-are they breathing? Is the blood pressure sufficient? Are they febrile?

Is there any evidence of head trauma?

When you examine the head of an infant, is the fontanel bulging? Is the neck stiff? Are the eyes deviated to the side? Tonic eye deviation to one side suggests *subtle seizures* and warrant treatment. SEE CHAPTER #12-MANY SEIZURES.

## Differential Diagnosis

People who present with coma and fever can have many other problems besides malaria including-

1. *meningitis*
2. *sepsis*
3. malaria with a very low blood sugar (glucose)
4. poisonings-especially with organophosphates ("bug medicine")
5. subtle seizures

You need to think about the possibility that another problem besides cerebral malaria exists. If there is malaria in your region, the blood smear is positive and the child is over 5 years old with no neck stiffness, then the problem is most likely cerebral malaria. If you suspect *meningitis*, it is better to begin treatment. SEE CHAPTER #4-HEADACHE (ACUTE).

## Management

Clear the airway of any secretions. If possible establish an IV line. Otherwise, a nasogastric tube will be necessary to give the patient liquid and sugar. IT IS IMPORTANT TO SOMEHOW ALWAYS GIVE SUGAR WATER WHEN ADMINISTERING QUININE, especially to children. Remember that low blood sugars are dangerous, too.

Begin treatment with the strongest anti-malarial medication you have available, preferably QUININE and give QUININE intravenously if possible. IV quinine should be given with IV fluids containing sugar (for example dextrose of glucose). Give 20mg of QUININE for each kg of patient weight over 4 hours followed by 10mg/kg every eight hours.

*For example-15 kg child*

*Start IV fluids with glucose*

*Include QUININE (20mg X 15kg)=300 mg quinine given over 4 hours in ~1/2 liter IVF*

*Then give (10mg X 15kg)=60 mg of quinine every eight hours.*

If you only have an oral agent, like Coartem, give this via nasogastric tube as soon as possible. If all you have is CHLOROQUINE, also give a second drug such as SEPTRIM.

Of course new treatments are recommended as the malaria parasite becomes resistant to old treatments. Your local health authorities, local hospital or national Ministry of Health may be good sources of information regarding the appropriate anti-malarial medications for your location. Many regions of the world now have malaria that will not respond to treatment with CHLOROQUINE. Pay attention and make certain you know the local health authorities' recommendations for malaria treatment in your district.

## Guidelines for follow-up

Patients with cerebral malaria are very ill people who need to be transferred to a hospital.



Your carefully kept notes are very valuable when the patient is taken to a doctor for care.

## Other Actions

Do not place all of your faith in the malaria medicines alone.



Remember-

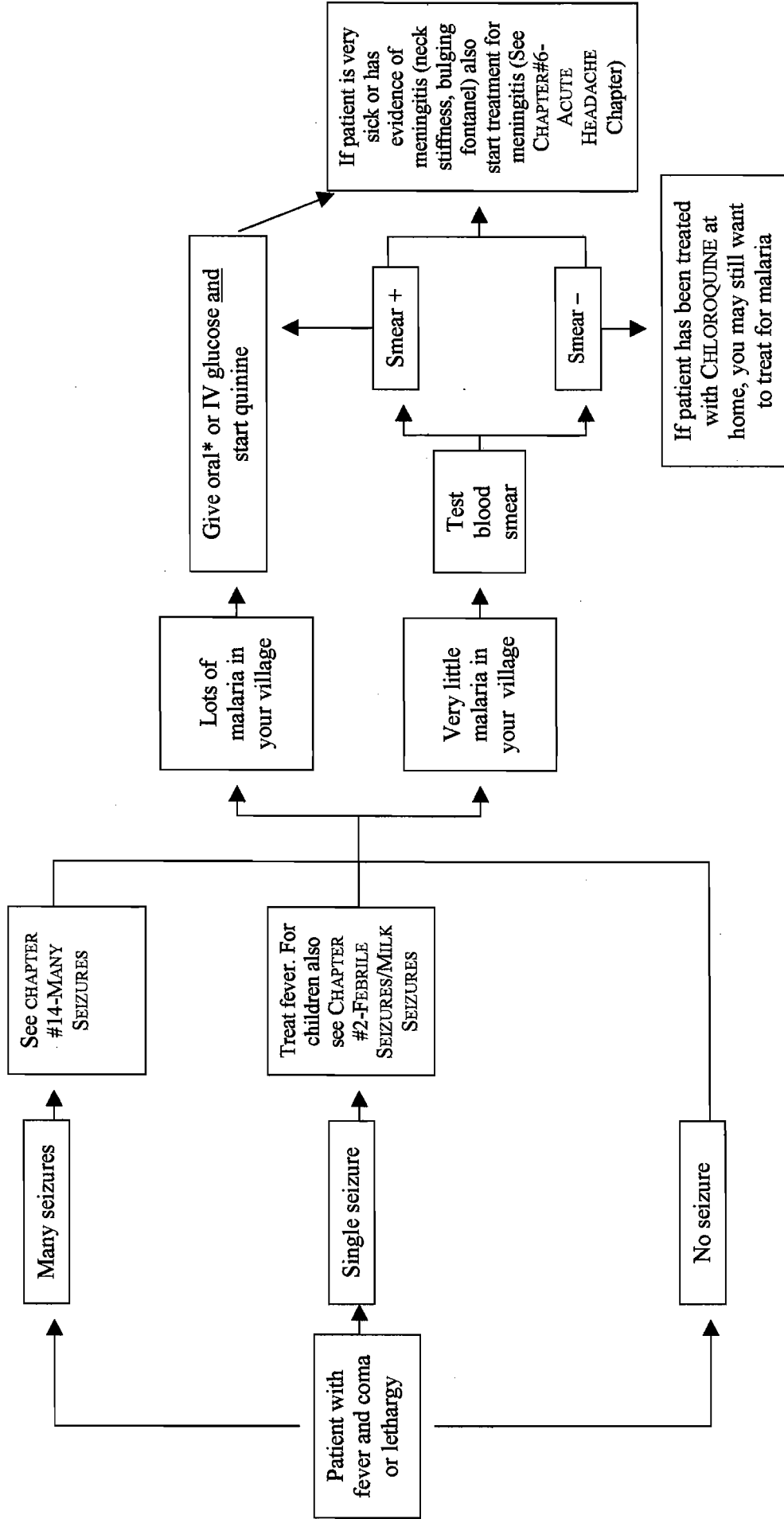
Fever and coma can occur from other problem (see the *Differential Diagnosis*)

Even if the patient has cerebral malaria, you still need to treat seizures, fever, low blood sugar and other infections. All patients in coma, from whatever cause, should have **coma precautions** taken in their care. For coma precautions, SEE CHAPTER #13-COMA.



## Summary: Cerebral Malaria

\*Can give oral glucose with breastmilk, juice, FANTA, Coke, or sugar water



## Chapter #14-Many Seizures (*Status Epilepticus*)

### Case Example

Moses Mweembe is a 22 year-old man brought to clinic convulsing. You witness two seizures. The family reports he had a seizure this morning which was why they brought him to clinic. After Moses has seizures, his family says he becomes very difficult to manage and can even become violent. When Moses has not had a seizure, he is a very gentle man. You look in his medical book and see that he has been diagnosed with epilepsy in the past, but it does not appear that he has come in for review or PHENOBARBITONE for several months.

### Discussion

*Status Epilepticus* occurs when someone has more than one seizure without recovering in between. As a general rule, we become concerned that someone may be in *status epilepticus* if they fail to recover consciousness within 30 minutes after a seizure. Sometimes a single seizure can last more than 30 minutes and this is *status epilepticus*, too.

Having many seizures without waking between then is very dangerous to the brain. Several different problems can cause someone to have many seizures. In the case example, Moses has epilepsy. Patients with epilepsy are at risk for developing *status epilepticus*. Children with febrile seizures can also have *status epilepticus*, especially if their fever is not treated. People with *meningitis* can also suffer from many seizures.



Regardless of the reason for *status epilepticus*, you must treat the seizures **immediately**.

### Other Key Points

If someone comes in with convulsions and continues to have one seizure after another, it is easy for you to recognize that the patient has *status epilepticus*. Recognizing *subtle seizures* is much more difficult, but *subtle seizures* are also dangerous and need emergent treatment.

*Subtle seizures* occur after convulsions. Usually, people with *subtle seizures* start by have all over body shaking and stiffening, but this may change to minor twitches and eye movements with rhythmic jerks of the eyes that can only be see when you lift their eyelids. People with *subtle seizures* often appear comatose, until you closely watch them and see that one arm or leg, perhaps even their face, twitches or jerks rhythmically (like a drum beat). This is a sign that the patient has *subtle status*. Treat them for *status epilepticus* as shown below.

People without epilepsy can present with their first seizure in *status epilepticus*.

### Management



*Status epilepticus*, like coma, is a neurologic emergency. If a patient has had many seizures and is not waking up, you should begin treatment immediately and take time afterwards to try and discover the cause.

## Treatment for *status epilepticus*-

<b>What to do...</b>		<b>Why...</b>
Quickly examine for evidence of trauma. Stop any extreme bleeding. Stabilize the patient's neck if trauma occurred.		Severe bleeding and a neck fracture need emergency treatment, too.
Give DIAZEPAM and then PHENOBARBITONE as shown below. While giving the medicines, pay close attention to the patient's breathing.		These are the medicines that can stop seizures. They also slow breathing. You can cause a patient to completely stop breathing if you give too much medicine too quickly.
Observe coma precautions as described SEE CHAPTER #13-COMA.		Patients with <i>status epilepticus</i> usually are in coma, especially after receiving PHENOBARBITONE and DIAZEPAM.
Try to determine what the underlying cause of the seizures is and treat if possible.		PHENOBARBITONE and DIAZEPAM will stop seizures, but they do not treat malaria or <i>meningitis</i> . <b>The problems that caused the seizures still needs treatment.</b>
Get help from a doctor or hospital if possible		Patients with <i>status epilepticus</i> are very ill and may need more care than you can provide alone.
<b>For Infants-</b> <b>DIAZEPAM ~0.5-2.0 mg</b> <b>Can repeat in 5 minutes if needed.</b> Give a maximum of 0.025 mg/kg if this is tolerated.  <b>Then, 10-15 mg/kg PHENOBARBITONE</b> <b>~100-250 mg</b>	<b>For Children-</b> <b>DIAZEPAM 2.0-5.0mg</b> <b>Can repeat in 5 minutes if needed.</b>  <b>Then, 10-15 mg/kg PHENOBARBITONE</b> <b>~500 mg</b>	<b>For Adults-</b> <b>DIAZEPAM 4.0-8.0 mg</b> <b>Can repeat in 5 minutes if needed.</b>  <b>Then, 10-15 mg/kg PHENOBARBITONE</b> <b>~800-1000mg</b>



When you are considering whether or not to give someone a third dose of DIAZEPAM, count their respirations for a full minute. On average, adults with healthy lungs breathe 12-16 times in a minute. If your adult patient is breathing less than 8 times a minute or child is breathing less than 10 times a minute do not give any more diazepam! The medication may be depressing their ability to breathe.

## Questions to ask

Once you have treated the patient for *status epilepticus*, you can begin to try and find out why the patient had so many seizures.

1. Does the patient have epilepsy?

Review their medical records and ask family members about any previous convulsions.

2. If the patient has epilepsy, did he or she recently stop taking their medicines?

Abruptly discontinuing medicines for seizures can cause the patient to have many seizures.

3. Is the patient a very heavy drinker?

Chronic drinkers (also called alcoholics or drunkards) can develop *status epilepticus*.

4. Was the patient ill before the seizures began?

Malaria with febrile seizures, cerebral malaria, *meningitis*--all these can cause seizures.

5. Did the patient experience any head trauma?

If so, review CHAPTER #10-HEAD INJURIES after treating the seizures.

6. Could the patient have taken a poison?  
Poisons can cause many seizures.

## Examination

After recognizing and treating *status epilepticus*, examine and treat the patient's level-of-consciousness. SEE CHAPTER #13-COMA.

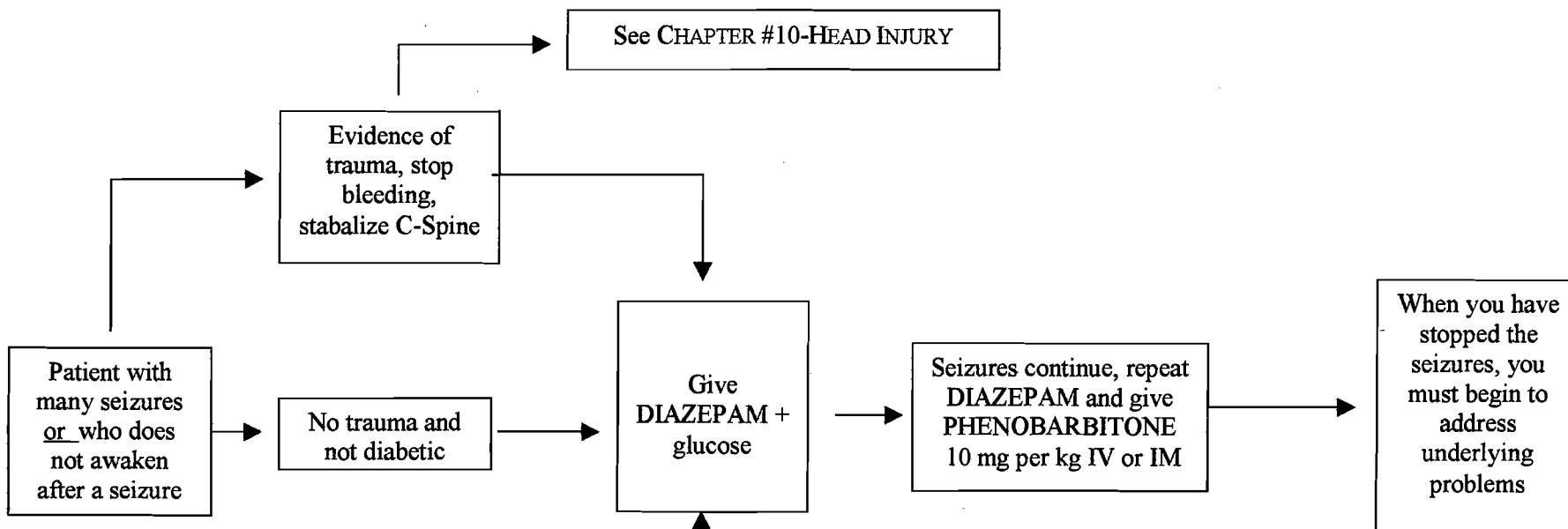
## Guidelines for Follow-up

Patients who survive *status epilepticus* should be carefully watched for several days. If this is a patient with known epilepsy, the patient will need to be treated with PHENOBARBITONE for a very long time to assure that they do not experience *status epilepticus* again.

Children who develop many seizures due to a simple fever may need to be treated with PHENOBARBITONE for a few months. Be certain to provide the mother with PARACETAMOL to take home. She needs to be certain to give the child PARACETAMOL and bring the child to you for review whenever they have a fever.

Patients who have *status epilepticus* should be referred to a doctor as soon as possible.

**Summary: Many Seizures (Status Epilepticus)**



DIAZEPAM		
Infants	Children	Adults
0.5-2.0 mg	2.0-5.0 mg	4.0-10.0 mg

PHENOBARBITONE		
Infants	Children	Adults
100-250mg	500mg	800-1000mg

## Chapter #15-Coma

### Case Example

Lucia Zumbunu is a woman brought to you unconscious. Her family has not arrived yet. All you know is that she lives in a village about an hour away and she has been unconscious since the driver of the truck agreed to bring her in. You notice that she has some twitching movements around her eyes, but she does not wake up when you call her name or shake her. She does not feel especially warm to the touch. You are frustrated...what can you do for this woman when there is no one available to tell you how she came to be unconscious!?!

### Discussion

Caring for a patient who is brought to you in a *coma* can be difficult, especially if no one is available to tell you what has happened, but there are many important observations you can make and a few critical tests that will offer much guidance on how to proceed. Of course, when her family arrives they can give you more history of Lucia's illness.

Coma is a common presenting problem to hospital and even village health workers, so it is especially important that you develop an organized approach to the patient with coma. **DO NOT ASSUME THAT EVERYONE IN COMA HAS MALARIA!** You may indeed see a great deal of malaria and it may even be wise to treat everyone in a coma for malaria while you make investigations to confirm that the patient has malaria and not another problem. Coma can be due to many different problems and **QUININE** or **CHLOROQUINE** will **ONLY TREAT** malaria.

Coma, or deep unconsciousness from which you cannot arouse the patient, may occur suddenly in the case of trauma but it can also proceed more slowly, beginning with progressive sleepiness and confusion. In children, irritability (crying that cannot be comforted) can precede lethargy and sleepiness. Coma indicates a very serious condition that often results in death but some causes of coma can be treated. **TIME IS VERY IMPORTANT WHEN TREATING COMA.** People in coma may have a problem that is worsening as they wait for treatment. You cannot wait for more help to arrive. Begin emergency treatment and evaluation right away!

### Other Key Points

Coma describes a physical condition (meaning that the patient is unconscious), but it does not tell you why the patient is unconscious. Almost any problem in the brain and many problems affecting the general body can result in coma. Here we will focus upon those causes of coma you are more likely to see with special attention to those that you can effectively treat.

Common and/or treatable causes of coma-

1. malaria with convulsions
2. cerebral malaria
3. *meningitis*
4. *hypoglycemia* (low blood sugar)-often related to intravenous **QUININE** or too much insulin
5. *diabetes mellitus* (extremely high blood sugar)
6. *status epilepticus*
7. *sepsis*
8. head trauma
9. stroke
10. poisoning (especially with insecticides)
11. alcohol (drunkenness)

Each of these causes needs to be dealt with in a slightly different way and will be discussed briefly here.



### What to do right away

Coma is an emergency situation. You cannot wait until all the important information is gathered and you have completed a full neurologic examination to decide what to do. You must begin by acting quickly and beginning treatment. When a patient is in coma, you should begin treatment before you are absolutely certain of the problem because you may only have a short time to act before the patient dies or brain damage occurs. Begin with EMERGENCY COMA TREATMENT right away. After you have completed this list (or as much as you can do with the medicines and resources available to you) you can take the time to ask careful questions, complete a thorough examination and get test results.

#### **Emergency Coma Treatment**

<u>What to do-</u>	<u>Why-</u>
Look for signs of trauma including dark rings around the eyes and ears and blood in the eyes, ears and nose. SEE CHAPTER #12-HEAD INJURY.	Head injuries require different treatment than many other types of coma.
Evaluate to patient's breathing and pulse. Assure that nothing is blocking their airway. If someone is working with you, ask them to take the patients blood pressure, pulse and temperature and write them down for you.	You want to make certain that no object or food item has gotten stuck in the patient's throat and caused them to pass out. The vital signs will be important later as you try to determine if your treatments are helping or not.
Give intravenous (IV) dextrose or glucose if any is available. If you do not have access to intravenous supplies but can <u>safely</u> place a nasogastric tube <sup>7</sup> , do so immediately and give sugar water (about 1 cup) right away. If you do not have sugar water available, give Fanta <sup>®</sup> , coke, or juice.  DO NOT ATTEMPT TO GIVE ANYTHING BY MOUTH IN AN UNCONSCIOUS PATIENT.	Low blood sugars are dangerous and can be the cause of coma, especially in diabetics who take medicines to lower their blood sugar (if they take too much medicine or fail to eat after the medicine).  Giving oral medicines, fluids or food to unconscious patients may cause it to get into their lungs and result in pneumonia!
If you live in a region with a great deal of malaria, begin QUININE right away. In a comatose patient, intravenous QUININE is best so use this if you have it. Otherwise, give QUININE or CHLOROQUINE intramuscularly. Give the LOADING DOSE described in the drug directory.	Patients with malaria as a cause of coma are extremely sick and cannot wait until the blood smear is back from the laboratory. QUININE can cause the blood sugar to drop and you must make certain that the patient is getting some extra glucose (either by intravenous or nasogastric fluids) while giving QUININE.
If the patient has a stiff neck and fever or is under 1 year old, treat for meningitis right away (See page 41 in CHAPTER #6-HEADACHE (ACUTE) for drug options.	Meningitis requires immediate treatment. Children under one year are especially susceptible and may not even get a fever.  These antibiotics will also help patients suffering from some types of sepsis.
If the patient has a history of epilepsy, was witnessed to be convulsing before the coma or seems to have convulsions or twitching movement, give DIAZEPAM. Then give a loading dose of PHENOBARBITONE.	<i>Status epilepticus</i> can occur in patients with epilepsy or any brain problem and must be treated immediately.

<sup>7</sup> Never place a nasogastric tube in someone with facial trauma

<sup>8</sup> Fanta is full of sugar and can be an excellent substitute for sugar water since you can safely keep some on hand in clinic simply by having a bottle (unopened) available. Of course, Fanta can NEVER be given intravenously. Only safe, specially made intravenous fluids can be given by vein.

At this point, you have treated many of the most urgent problems that could have caused coma. You can take some time to consider what to do. If the patient's coma was due to *hypoglycemia*, they may already be waking up.

Investigations include a glucose (dextrose or d-stick), blood smear for MPs, and a complete blood count.

## Questions to ask

You will want to try and determine if any of the ten causes of coma are likely to be the cause of this patient's condition. Ask the family several questions to help determine underlying problem.

1. Did the patient become ill very quickly? Over a few days? Or for weeks?  
Except in very young children, malaria should take a day to get severe enough to produce a coma. Strokes on the other hand happen very quickly.
2. Does the patient take any medicines? Look in their medical record book. Is there a history of epilepsy or diabetes?  
Patients with diabetes take medicines to lower their blood sugar. If the patient takes too much medicine or takes the medicine without eating, their blood sugar can drop dangerously low. Simply giving them sugar water solution until the medicine is cleared from their system will "cure" them, but you may need to treat them for 1-3 days with sugar water since with some of the medicines take a long time to leave the body.
3. Does the patient have a history of epilepsy or other seizures (including febrile seizures)?  
Patients can go into *status epilepticus* especially when they are ill or stop their medications. They may start out by convulsing, but only have small twitches by the time you see them. If you suspect this person may have *status epilepticus*, SEE CHAPTER #12-MANY SEIZURES and follow instructions on how to care for this problem.
4. Does the patient appear chronically ill?  
Patients who appear wasted and chronically ill may suffer from HIV/AIDS. AIDS makes people more susceptible to brain infections. They may also have TB or other unrecognized infections. TB, especially in children, can infect the brain. Treatment with medicine such as CHLORAMPHENICOL while you wait for further help is important. A patient who absconded from TB treatment comes in with coma, restart treatment and begin antibiotics for *meningitis*.

## Examinations

Examining a patient in coma seems difficult at first. After all, how can you examine someone who cannot follow any of your instructions or even open their eyes? In fact, there are several important things you can look for that will help guide you in deciding what the patient's problem may be.

Pay attention to the vital signs. Patients with malaria, meningitis, sepsis and heat stroke are all likely to be hyperthermic with temperatures as high as 42 degrees Celsius.



This may not be true for the very young and very old. Remember, infants under 1-year and the elderly may not be strong enough to develop a high fever and instead may have *hypothermia* with low body temperatures!

Patients with a fever will usually be sweating and wet unless they are very *dehydrated*. Patients with *hypoglycemia* may also be sweating. Heat stroke usually results in *dehydration* and patients are hot and dry. Poisoning with *organophosphates* (bug spray for crops) that are commonly used in farming cause patients to present with convulsion and coma.



Blood pressure in adults is also important to note and follow. If you find the patient has very high blood pressure (for example 200/150), the patient may have had a stroke. Low blood pressure in adults can indicate *sepsis* or severe *dehydration* from diarrhea, vomiting, heat stroke or fever.

Next, examine the patient's head, neck and body for any sign of trauma. Be certain to look in and behind their ears. Bruising around the ears and eyes suggest head trauma. Blood or clear liquid flowing from the patients nose or ears also suggests head trauma. If there is evidence of trauma, SEE CHAPTER #10-HEAD INJURIES. If there is no evidence of head trauma, flex the neck gently (by placing the chin gently against the chest) to see if there is evidence of *meningismus* indicating *meningitis*.

Squeeze the patient's toes and fingers—not hard enough to injure them but hard enough that they should pull away. If the patient only pulls away on one side they may have a *hemiparesis* suggesting a stroke. Treat for brain swelling as described in CHAPTER #9-ACUTE PARALYSIS.

Finally, observe the patient's face. Is one side drooping? This is a sign of *hemiparesis* and may indicate a stroke. Lift the eyelids. What size are the pupils (the black center part of the eyes). Are they the same size? Very small pupils may mean the patient has had a stroke deep in the brain or been poisoned with *organophosphates*. If the pupils are very different in size, the patient may have swelling or injury to one side of the brain. Treat them as shown in CHAPTER #10-HEAD TRAUMA. You should try to get help as soon as possible. The eyes may deviate to one side with strokes or seizures. Throughout the examination, look for any sign that the patient is having a seizure. Seizures are something you can treat! SEE CHAPTER #12-MANY SEIZURES.

### Other possible problems (*Differential Diagnosis*)

Sometimes a hysterical patient may “pretend” to be in coma. If you suspect the patient is hysterical or only acting like he or she is unconscious, it is best to isolate them from whoever brought them in and take them to a quiet place for close observation. Often when no one is around to witness their great play-acting, such individuals will begin to speak with you. This is not a common event and you need to explore what family or personal problems caused the patient to react in this way.

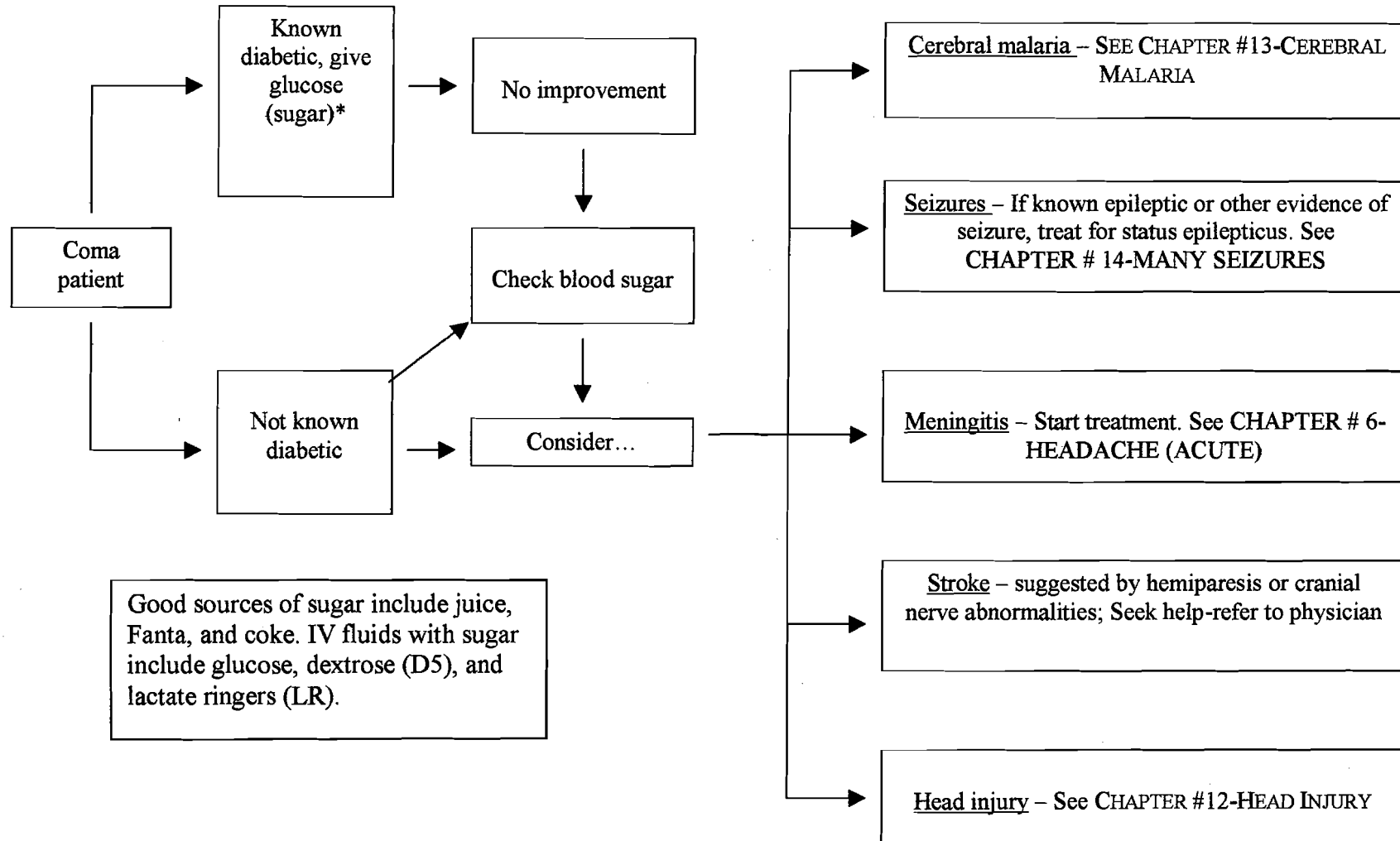
### Management

For patients presenting with coma from an unclear cause, you must first treat all emergent problems. Then take some time to examine the patient more completely, get as much history from their friends or family and decide what you think the problem may be. Some problems, like *sepsis* are not neurologic disorders but instead are severe medical illnesses that only present with neurologic symptoms. If the problem is a neurologic one, such as *meningitis*, seizures, or head injury, go to the chapter in this manual that helps guide you in how to treat the patients.

### Other Actions

When a patient is brought to you in coma, they are very sick. You must act and think quickly. Unfortunately, some people brought to you in coma are so sick that nothing you may do will help. However, if you follow the recommendations here you will be helping some people who would otherwise probably die.

## Summary: Coma



## Special Topics

Most of this manual has been organized by complaint. Unfortunately, leprosy and HIV/AIDS are two common conditions that can affect the nervous system but may present with a wide variety of signs and symptoms. Here we will present an overview of each of these conditions so you may be able to recognize the disorders and management them appropriately.

### **Leprosy**

#### **Background**

Leprosy, also known as Hansen's Disease, is an ancient problem written about in the Bible and early Indian and Chinese writings. Leprosy is still the most common, treatable neuropathy in the world. Determined efforts to identify and cure leprosy have occurred in many regions of Africa. As a result, many paramedical professionals (nurses, clinical officers, etc.) have already received excellent training in leprosy diagnosis and care. This brief review is no substitute for such extensive expertise, but will hopefully, allow individuals without extensive leprosy education to recognize the disorder and refer the affected person to the appropriate sources for evaluation and treatment. Early diagnosis and treatment of leprosy is especially critical since delayed treatment results in avoidable physical disability.

#### **Causative Organism**

*Mycobacterium leprae*, the organism that causes leprosy, invades nerves causing damage that results in anesthesia (loss of sensation). Repeated injuries and poor healing occur in these regions of the body without normal sensation resulting in the familiar deformities associated with leprosy. *M. leprae* cannot survive at the core temperature of the human body (~37 degrees Celsius) and therefore attacks distant extremities, like the fingertips, that are somewhat cooler. If you can remember this, you can remember many of the key features used to identify leprosy infections.

#### **Transmission**

The exact mode of transmission for leprosy (meaning how people catch the disease) is unclear. It is important to remember that your risk of catching leprosy when you care for these patients is VERY, VERY LOW!!!

#### **Presentation of Leprosy**

Although only one organism causes leprosy, people's immune system may respond in two different ways resulting in tuberculoid leprosy or lepromatous leprosy.

##### Tuberculoid leprosy

Skin lesions develop (one or more) that are irregularly shaped, well-outlined regions where the skin loses pigments and becomes very pale. These skin lesions have a raised, red border and are anesthetic (without sensation) and anhydrotic (unable to produce sweat). Such lesions are generally located on the extremities, face, upper back and buttocks. Enlarged nerve trunks for nerves near the lesions may also be palpated.

##### Lepromatous Leprosy

Thickened skin in otherwise health appearing skin occurs in lepromatous leprosy with associated nasal stuffiness. People who cannot breathe through their nose will breathe through their mouth allowing the oral cavity to become cool with bacilli then invading the mouth. Nodular skin lesions can develop. In severe cases without treatment, the airway may become blocked causing suffocation.

Some patients will have features of both tuberculoid and lepromatous leprosy. This is called "Borderline" leprosy.

**Examination**

Examination of skin lesions should always assess the sensation of such lesions, preferable using both light touch (cotton wool) and sharp touch (pin<sup>9</sup>). Sensation should also be examined in regions where the skin appears normal. Since the organism can only live at cool temperatures, sensation is first lost on the ears, nose, upper lip, forehead, tops of the hands and tops of the feet. THE THICK SKIN ON THE PALMS AND SOLES INSULATE THESE AREAS AND THEY TEND TO BE SPARED EARLY IN THE INFECTION. Advanced disease can result in the sensory loss pattern noted below.

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<sup>9</sup> ALWAYS use a clean pin and never prick sharply enough to cause bleeding!

Sensory nerves are affected first, but eventually motor nerves also become affected resulting in clawing of the fingers and toes, a foot drop, wrist drop, or lagophthalmos. Lagophthalmos is an inability to close the eyes and individuals with lagophthalmos are at risk for eye injuries with infections and eventual blindness. Cold abscesses may develop at lesion sites. Regions without sensation are vulnerable to injury and infection. Injuries are especially common in the fingertips and feet.

### **Diagnostic Testing**

Tuberculoid leprosy skin lesions may be biopsied near the outer edge of the lesion where bacilli can be identified. If you suspect someone has leprosy, referral to a local expert or physician should be made so appropriate diagnosis and treatment can be initiated. Is there a local Leprosy Control Officer in your district?

### **Treatment**

Leprosy is a curable condition using drugs such as dapsone and clofazimine (Lamprene). A typical regimen may include dapsone 100mg daily with rifampacin 600mg daily for 6 months with dapsone continued for 3-5 years. Lamprene may be added in regions where dapsone resistance is of some concern. Corticosteroids are often added to limit the secondary nerve damage that can occur as the infected nerves react to treatment. Steroid eye drops and antibiotics with debridement to ulcerous lesions may also be necessary. Treatment of leprosy is best handled at clinics with leprosy experts available for diagnosis and management of treatment complications.

After treatment, regions with sensory loss may still be at risk for injury. Eye protection in the form of glasses is recommended for patients with lagophthalmos. Good foot ware and foot care are important. Gloves may be needed for patients who smoke or handle sharp or hot compounds.



Leprosy is a curable condition. When unrecognized or untreated, permanent severe disability can result. Your community or a nearby clinic probably already has leprosy experts available to assist you with these patients. If you suspect leprosy, send your patients for review by the experts!!

## **HIV/AIDS and the Nervous System**

The HIV virus causes acquired immune deficiency syndrome (AIDS), which results in failure of the immune system to successfully fight infections. When someone has AIDS, their immune system may also malfunction and “attack” nervous system tissue (nerves, spine, and brain) as though these tissues are foreign invaders. People with HIV are very susceptible to infections such as tuberculosis, which can also infect otherwise healthy people. HIV infected individuals may also become infected by organisms that ALMOST NEVER infect people with normal immune systems. Often these previously unusual infection, (meaning infections rarely seen before the AIDS epidemic) are infections in the nervous system.

Great efforts are being made to educate the population in how to prevent the spread of AIDS. AIDS cannot be cured by any known treatment, but much research is being conducted to develop an AIDS vaccine. For the first time in recent history, “western” medicine and traditional healers are trying to collaborate to find affordable treatment options, but for now we are in the midst of a terrible epidemic. Drugs to treat HIV are called antiretrovirals (or ARVs). You probably see a lot of HIV-related nervous system disorders. Below is a brief description of the most common HIV-related neurologic conditions.

### **HIV-related disorders of the peripheral nerves**

#### **Peripheral neuropathy**

Symptoms of burning and numb feet occur with HIV infection, especially among patients who are also taking TB medications without vitamin supplements. Pain may be the most prominent feature of HIV-neuropathy and may be severe enough that the person becomes bed bound. Treatment is the same as for other causes of peripheral neuropathy. See CHAPTER#4-BURNING OR NUMB FEET. Vitamin B complex may be especially helpful.

#### **Bell’s Palsy (See CHAPTER # 5-FACIAL PARALYSIS)**

Bell’s palsy can occur in anyone, but may be especially common among people who have become recently infected with HIV. Patients with facial paralysis during HIV seroconversion (meaning recent infection) often complain of headache and minor neck stiffness.

#### **Guillain Barre Syndrome (See CHAPTER #11-ACUTE PARALYSIS)**

This syndrome involves a progressive ascending paralysis beginning with tingling and numbness in the feet progressing to an inability to walk, then sit, then use the arms, etc. GBS may occur in anyone after minor infections, but is especially common among people with HIV infection. Others with GBS generally recover fully if the paralysis does not involve the respiratory muscles, but among those with GBS and HIV recovery may be incomplete and recurrent paralysis can occur.

#### **Disseminated Herpes Zoster**

Zoster affecting a single dermatome (small strip of skin fed by a single nerve root) can occur in anyone and is especially common in the elderly. If zoster affects large regions of the body, immune system dysfunction is probable. Cancer and HIV are common causes underlying disseminated herpes zoster. Treatment with topical antibiotics to prevent infection and Tricyclic antidepressants (like AMITRITPYLINE) are also helpful for alleviating the pain.

If zoster affects the eye, refer patients to the nearest medical center. Special treatment may be needed to avoid scarring of the eye with resulting blindness.



Zoster affecting the eye or tip of the nose should be referred to a physician for further treatment.

These people are at risk for blindness if the eye becomes scarred.

### **HIV-related disorders of the spine**

#### **Tropical Spastic Paraparesis (HTLV-1)**

Tropical spastic paraparesis is a viral infection of the spinal cord with HTLV-1 resulting in stiffening of the lower limbs that may eventually result in an inability to walk. The progress is slow occurring over weeks to months. HTLV-1 may also occur in individuals without HIV infection.

### Vacuolar or CMV Myelopathy

Spinal cord degeneration from HIV or cytomegalovirus (CMV) due to HIV can result in a slowly progressive, flaccid paraparesis. Bowel and bladder function are often spared. This is generally a late-stage HIV-related disorder and will occur in individuals who have already had other HIV-related infections.



Spinal schistosomiasis may also present with a progressive flaccid paraparesis. Schistosoma eggs can be found in the stool or urine and spinal fluid analysis will reveal white blood cells (especially eosinophiles which are otherwise rare in the spinal fluid). Schisto treatment may halt this disease and should always be considered in patients with a slowly progressive paraparesis.

### **HIV-related disorders of the eye**

#### CMV retinitis

Sudden, unilateral visual loss in someone who has already exhibited other HIV-related infections may be due to CMV retinitis. An ophthalmoscopic examination reveals cotton wool spots, hemorrhages and other retinal changes. Kaposi's sarcoma may also infect the eye.

### **HIV-related disorders of the brain**

#### TB Meningitis

People without HIV can certainly get TB meningitis, but TB and extrapulmonary TB are both more likely in immunocompromised patients. Symptoms may include headache, hemiparesis, seizures, cranial nerve abnormalities and in children hydrocephalus.

#### Cryptococcal Meningitis

Fungal meningitides were previously uncommon before the HIV epidemic. Unlike bacterial meningitis, which present with high fever, neck stiffness, and obvious illness. Cryptococcal meningitis can be more sinister presenting with a low-grade nagging headache that slowly increases until the patient is very debilitated. Cranial nerve abnormalities can also occur. The diagnosis is confirmed when fungal hyphae are seen in the cerebrospinal fluid. Treatment with amphotericin B and/or fluconazole or ketoconazole can provide some treatment to slow the disease, but as AIDS progresses the infection generally recurs. Pain relief may also be provided with repeated lumbar punctures since much of the pain is due to high pressure around the brain and draining fluid can relieve this pressure.

#### Toxoplasmosis gondii

Cats carry this infection and many of us have already had a minor infection by the time we are adult. Unfortunately, when the immune system is destroyed by HIV the "old" infection is reactivated and can spread to the brain. Slow growing lesions cause headache and a subacute hemiparesis (developing over hours to days). A 2-week trial of sulfadoxine/pyrimethamine, (Fansidar)-2 tabs two times a day, may improve the weakness, but must then be continued indefinitely. This can be problematic when drug supplies are limited. HIV-infected individuals are also at relatively high risk for skin reactions to sulfa-containing medications (like Steven Johnsons Syndrome).

#### Progressive Multifocal Leukoencephalopathy

Caused by the JC Virus<sup>10</sup>, this disorder presents with seizures and hemiparesis and generally occurs in individuals who have already had AIDS-defining illnesses.

#### AIDS-related Dementia

A dementia characterized by slowed movement, slowed thinking and apathy can occur with HIV. Little is known regarding how large a problem this is in southern Africa. Depression may also present in this fashion. A 3-month trial of an antidepressant (like AMITRIPTYLINE) should be considered in anyone who present with these symptoms.

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<sup>10</sup> This is NOT the same as the CJD disease associated with "Mad Cow" disease

### Syphilis

In people infected with HIV, syphilis can rapidly progress to involve the brain and spine. This may include painful crises with terrible lancinating pains shooting from the spine, rapidly progressive dementia, or psychotic behaviors. Tertiary syphilis should be considered in anyone presenting with these symptoms. A VDRL or RPR test may be helpful. Referral to a physician should also be considered.

### ARV toxicity

Drugs to treat HIV can also cause some damage to the nervous system. Patients receiving ARVs should be under the care of a physician, but if they come to your attention with a neurologic complaint including new weakness, numbness, or burning feet it is best to tell them to see the doctor who is providing their HIV care. The new symptoms could be related to the ARV or could be due to an AIDS-related infection necessitating a change in the ARV drugs.







## **A word about how you give medicines...**

You will notice that throughout this drug directory we list ALL the different routes of drug administration possible. The “route of administration” is HOW you get the medicine into the patient—by mouth, by rectum, by injection into the vein, by injection into the muscle, etc.

Most of the time, pills and liquids that can be taken by mouth are the best and safest way to give medication. The next safest route for many medicines is by rectum. All medicines cannot be given by rectum however. Injections should not be used when a patient is able to take pills (meaning the patient is awake, can swallow and is not vomiting). Injections can be life-saving when someone has cerebral malaria or status epilepticus...but injections should only be used when the patient is not able to swallow OR the patient is very, very ill (for example, with meningitis). Of course, you can only give injections if you have supplies of SAFE, STERILE needles and needles must never be used without sterilization. Each needle for injections or intravenous drug delivery should be reserved for use by a single patient.

Drug doses are divided into three categories—infants, children, and adults. One key factor that determines the appropriate drug dose is weight. On average, infants weigh 3-10kg, children 10-35kg and adults > 35kg. For your patient, consider how much they weigh when choosing the dose of medication as shown in the provided tables.

## Drug Directory

### Amitriptyline = TCA (pill size: 25 mg, 50 mg, 100 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Elavil	Pain	Nortriptyline
Endep	Migraines	
Tryptizol	Depression	

How to give this to the patient with migraine or neuropathic pain...

	Dose	Instructions	Caution
<b>Adults</b>	12.5-25 mg	By mouth at bedtime	Dry Mouth
	Up to 75 mg But increase dose slowly over weeks		Problems with urination in older men. Older patients may also become confused, in which case the dose must be lowered or the medication stopped.

### Amoxicillin = antibiotic (pill size: 250 mg, 500 mg)

This drug is also called...	Use this medicine to treat...
Amoxil	Infections
Polymox	Pneumonia
Trimox	STD
Wymox	

How to give this to the patients with meningitis or sepsis...

	Dose	Instructions	Caution
<b>Adults</b>	500 mg	By mouth every 8 hours	Not great choice for meningitis. Use it for meningitis only if you don't have any other antibiotics
<b>Children</b>	250 mg		
<b>Infants</b>	125 mg		

### Ampicillin = antibiotic (pill size: 250 mg, 500mg)

This drug is also called...	Use this medicine to treat...
Omnipen	Infections
Omnipen-N	STD
Polycillin-N	Soft tissues infections
Polycillin	RTI
Principen	

How to give this drug to the patients with meningitis or sepsis...

	Dose	Instructions	Caution
<b>Adults</b>	1500 mg	Every 4 hours by mouth, intravenous or intramuscular injection.	Watch for rash. If rash develops, stop medicine.
<b>Children</b>	1250 mg		
<b>Infants</b>	500		

**Aspirin = nonsteroidal anti-inflammatory drugs  
(pill size: 325 mg)**

This drug is also called...	Use this medicine to treat...
Salicylic Acid	Pain
Bayer	Fever
Ecotrin	Prevent blood clots
Empirin	

How to give this to the patients with pain...

	Dose	Instructions	Caution
<b>Adults</b>	650 mg	Every 4-6 hours	Take with food Watch for abdominal pain and dark stools with chronic use Try to avoid in children if you have <b>PARACETOMOL AVAILABLE INSTEAD</b>
<b>Children</b>	325 mg		
<b>Infants</b>	162.5 mg		

**Atenolol = beta-blocker (pill size: 25 mg, 50 mg, 100 mg)**

This drug is also called...	Use this medicine to treat...	It is like...
Tenormin	HTN	Metoprolol
	Migraine	Propranolol

How to give this to a patient with migraines...

	Dose	Instruction	Caution
<b>Adult</b>	50 mg	By mouth daily	May cause shortness of breath. If so, stop medicine. Sexual dysfunction in men Stop in pregnant women

**B12 - B complex vitamin (vials: 50 mcg, 100 mcg)**

This drug is also called...	Use this medicine to treat...
Cyanocobalamine	B12 deficiency

How to give this to the patients with neuropathy...

	Dose	Instructions	Caution
<b>Adults</b>	50 mcg	Injected into muscle (IM) everyday for 1 week, then 100 mcg every month	Try to get a doctor to review patient.

**Brufen = non-steroidal antiinflammatory (NSAID)**  
**(pill size: 100 mg, 200 mg)**

This drug is also called...	Use this medicine to treat...	It is like...
Ibuprofen	Pain (mild to moderate)	Indomethacin
Motrin	Inflammation	
Profen		

How to give this to the patient with mild to moderate pain...

	Dose	Instructions	Caution
<b>Adults</b>	400 mg	By mouth 4 times a day	Take with food if long term use because medicine irritates the stomach If stomach pains or black stool occurs, stop medicine. Do <b>not</b> give for stomach pain.
<b>Children</b>	200 mg		
<b>Infants</b>	100 mg		

**Carbamazepine (CBZ) (pill size: 100 mg, 200 mg)**

This drug is also called...	Use this medicine to treat...
Tegretol	Epilepsy
	Neuropathic pain

How to give this to the patients with epilepsy...

	Dose	Instructions	Caution
<b>Adults</b>	200 mg Up to 400 mg	By mouth 3 times a day	If patient develops rash, stop medicine If patient gets dizzy or sleepy, you need to decrease the dose Do not give with ERYTHROMYCIN
<b>Children</b>	100 mg		

**Cefazolin = 1<sup>st</sup> generation cephalosporin (antibiotic)**  
**(pill size: 250 mg, 500 mg, 1000 mg)**

This drug is also called...	Use this medicine to treat...	It is like...
Ancef	Sepsis	Cephapirin
Kefzol	Meningitis (there are better medicines to use)	Cephalothin
		Cephadrine

How to give this to a patient with infection-

	Dose	Instruction	Caution
<b>Adult</b>	1000 mg	By injection into muscle every 6-8 hours	Rash-stop drug if patient develops a rash
<b>Children</b>	250-500mg	By injection into muscle every 6-8 hours	
<b>Infant</b>	75-125 mg	By injection into muscle every 6-8 hours	

## Chloramphenicol (pills or vial size: 500 mg)

This drug is also called...	Use this medicine to treat...
Chloromycetin	Menengitis-best choice! ☺
	Sepsis
	Infection

How to give CHLORAMPHENICOL to the patients with meningitis or sepsis...

	Dose	Instructions	Caution
Adults	500 mg	By mouth or injection every 6 hours	
Children	250 mg		
Infants	125 mg		

## Chlorpromazine

This drug is also called...	Use this medicine to treat...	It is like...
Thorazine	nausea	Metachlopramide for nausea
	tics	Haldol for chorea
	chorea	

How to give this to the patient with nausea or chorea...

	Dose	Instructions	Caution
Adults	10-50 mg	By mouth or intramuscular injection every 8-12 hours.	Treatment can CAUSE abnormal facial movements and stiffening of the muscles. Chronic use without physician review should be avoided.
Children	2.5-25 mg		

## Chloroquine = antimalarial (pill size: 250 mg, 300 mg)

This drug is also called...	Use this medicine to treat...
Aralen	Malaria

How to give this to the patient with malaria...

	Dose/Instructions	Caution
Adults	10mg/kg per day for two days, then 5mg per kg per day for two more days. <i>60kg adult</i> <i>(60kg) X (10mg)=600mg for 2 days</i> <i>(60kg) X (5mg)=300mg for 3<sup>rd</sup> day</i>	If severely ill, quinine is a better drug. Best if given in addition to another antimalarials drug such as Septrim.
Children		
Infant		

## Ciprofloxacin (pill size: 500 mg, 250 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Cipro	Infection	Ofloxacin
Ciloxan	Meningitis	
	Sepsis	
	UTI	

How to give this to the patient with sepsis or meningitis...

	Dose	Instructions	Caution
<b>Adults</b>	500-750 mg	By mouth every 12 hours	Do not use with theophylline
<b>Children</b>	250-500 mg		
<b>Infants</b>	125-250 mg		

## Clindamycin (pill size: 100 mg )

This drug is also called...	Use this medicine to treat...
Cleocin	Infections
	Meningitis

How to give this to the patient with sepsis or meningitis...

	Dose	Instructions	Caution
<b>Adults</b>	300-450 mg	By mouth every 6 hrs	If patient develops ringing in their ears or dizziness, you need to lower the dose.
	150-900 mg	By injection every 8 hrs	
<b>Children</b>	150-300 mg	By mouth every 6 hrs	
	150-500 mg	By injection every 8 hrs	
<b>Infants</b>	75-100mg	By mouth or injection every 6-8 hours	

## Codeine = narcotic (pill size: 30 mg, 60 mg)

This drug is also called...	Use this medicine to treat...	It is like...
May have several names and is often made in combination tablets with panadol.	Pain (severe)	Morphine
		Methadone
		Meperidine

How to give this to the patient with severe pain...

	Dose	Instructions	Caution
<b>Adults</b>	30-60 mg	By injection or mouth every 6 hours or as needed	Do not use with head injury. May be addictive. Avoid chronic use.
<b>Children</b>	7.5-15 mg		

## Diazepam = benzodiazepine (vial and pill size: 10 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Valium	Seizures	Ativan
	Status epilepticus	Lorazepam

How to give this to a patient with status epilepticus...

	Dose	Instruction	Caution
<b>Adult</b>	5 mg (may follow with another 5 mg if seizure continues 5 minutes after 1 <sup>st</sup> dose)	By injection or per rectum	Must watch breathing and follow by giving phenobarbitone. Do not give if breathing is less than 8 breathes per minute.
<b>Children</b>	2.5 mg (may follow with another 2.5-5.0 mg if seizure continues 5 minutes after 1 <sup>st</sup> dose)	By injection or per rectum	
<b>Infant</b>	0.25-2.5mg (may follow with another 1 mg if seizure continues 5 minutes after 1 <sup>st</sup> dose)	By injection or per rectum	

## Diphenhydramine = anti-emetic (stops nausea & vomiting) (pill size: 25 mg, 50 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Benadryl	Nausea	Metachlopramide
Benalyn	Allergic reactions	Promethazine
	Itching	Prochlorperazine

How to give this to a patient with nausea...

	Dose	Instruction	Caution
<b>Adult</b>	25-50 mg	By mouth or injection twice a day	Will cause sleepiness and dry mouth
	50 mg		
<b>Children</b>	12.5-25 mg		

## Erythromycin (pill size: 250 mg, 500 mg)

This drug is also called...	Use this medicine to treat...
E-mycin	Infections
Ery-tab	PID
Eryc	
PCE	

How to give this to the patient with sepsis or meningitis...

	Dose	Instructions	Caution
<b>Adults</b>	400-500 mg	By mouth or injection every 6 hours	Can cause nausea and abdominal pain Often causes diarrhea
<b>Children</b>	200-400 mg		
<b>Infants</b>	100-125 mg		



## Fansidar (Sulphadoxine-pyrimethamine)

This drug is also called...	Use this medicine to treat...	It is like...
Sulphadoxine	malaria	
Pyrimethamine		

How to give this to a patient-

	Dose	Instruction	Caution
Adult	3 tabs	Single Dose 1-2 days	Do not give to infants less than 2 months. Watch for rash May be used with QUININE
Children 10 and older	2 tabs		
Children 5-9	1 tab		
Children 1 - 4	½ tab		
Infant < 1 year	¼ tab		

## Gentamycin (vial size: 120 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Garamycin	Infection	Amikacin

How to give this to a patient with a severe infection...

	Dose	Instruction	Caution
Adult	60 mg	By injection daily	Can cause hearing and balance problems. If patient develops hearing and balance problems, stop this medicine.  Use only for severe illness
Children	30 mg		
Infant	15 mg		

## Haloperidol

This drug is also called...	Use this medicine to treat...	It is like...
Haldol	Psychosis	chlorpromazine
	Chorea or tics	

How to give this to the patient with mild to moderate pain...

	Dose	Instructions	Caution
Adults	1-5 mg	By mouth or intramuscular injection every 8-12 hours.	2 mg haloperidol = 100mg chlorpromazine
Children	0.5-2 mg		

## Indomethacin = non-steroidal anti-inflammatory drug

This drug is also called...	Use this medicine to treat...	It is like...
Indocin	Pain	Profen

How to give INDOMETHACIN to a patient with pain...

	Dose	Instruction	Caution
Adult	25 mg Can increase to 50 mg	By mouth once a day	Take with food- this drug can irritate stomach. If patient develops abdominal pains or dark stools, you must stop this medicine.

## Meperidine = narcotic (pill and vial size: 50 mg, 100 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Demerol	Pain (severe)	Morphine
		Codeine
		Methadone

How to give this to a patient with severe pain...

	Dose	Instruction	Caution
Adult	75 mg	By injection 4 times a day	Too much of the drug will cause a patient to stop breathing. The drug produces sleepiness and constipation.
Children	150-300mg		

## Methadone = narcotic (pill and vial size: 10 mg, 50 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Dolphin HCl	Pain (severe)	Morphine
		Codine
		Oxycodine

How to give this to the patient with severe pain...

	Dose	Instructions	Caution
Adults	5-10 mg	By pill, muscle, or subcutaneous (sq) injection as needed	Too much of the drug will cause a patient to stop breathing. The drug produces sleepiness and constipation.
Children	2.5-5 mg		

## Metoclopramide = anti-emetic (pill size: 10 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Reglan	Nausea with migraines	Promethazine
Plasil		Prochlorperazine

How to give this to the patient with nausea from migraines...

	Dose	Instructions	Caution
Adults	10 mg	By mouth or injection every 8 hours	If patient develops strange twitches, bizarre eye movement, or muscle tightening after this drug, treat with diphenhydramine.
Children	5 mg		

**Metronidazol = antibiotic, antitrichomonal  
(pill size: 250 mg, 500 mg)**

This drug is also called...	Use this medicine to treat...
Flagyl	Infections
Metrogel	

How to give this to the patient with sepsis or meningitis...

	Dose	Instructions	Caution
Adults	750 mg	By mouth or injection every 12 hours	Do not use with late pregnancy
Children	500 mg		Do not use in children under 1 year
Infants	250 mg		

**Metoprolol = beta-blocker**

This drug is also called...	Use this Medicine to treat...	It is like...
Lopressor	HTN	Propranolol
	Migraine	Atenolol

How to give this to a patient with migraines...

	Dose	Instructions	Caution
Adult	50 mg	1-2 pills two times each day	Do not give to patients with asthma. Stop this drug if the patient develops wheezing. May cause sexual dysfunction in men Can cause fatigue

**Morphine = narcotic (pill size: 10 mg, 20 mg, 60 mg)  
(vial size: 20 mg, 60 mg)**

This drug is also called...	Use this medicine to treat...	It is like...
Duramorph	Pain	Codeine
Astramorph		Methadone
Infumorph		Demerol

How to give this to the patient with severe pain...

	Dose	Instructions	Caution
Adults	20-60 mg	By mouth every 4-6 hours	Too much drug can cause breathing to stop
Children	10 mg		
Infants	2-10 mg		

## Multi-vitamin

This drug is also called...	Use this medicine to treat...
MVI	In pregnancy to improve nutrition
	Neuropathy
	Underweight children

How to give multi-vitamins to the malnourished patient or the patient with neuropathy-

	Dose	Instructions	Caution
<b>Adults</b>	1 pill	By mouth daily	Do not use more than the recommended dose
<b>Children</b>	½ pill		
<b>Infants</b>	¼ pill		

## Nortriptyline = TCA (pill size: 25 mg, 50 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Pamelor	Migraine	Amitriptyline
	Neuropathic pain	
	Depression	

How to give this to the patient with migraines or neuropathy-

	Dose	Instructions	Caution
<b>Adults</b>	25 mg	By mouth at bedtime. Can increase up to 75 mg at bedtime over a month.	Causes dry mouth and sleepiness May cause problems with urination in older men.

## Paracetamol (pill size: 500 mg, 325 mg)

This drug is also called...	Use this medicine to treat...
Panadol	Fever
Acetaminophen	Pain (mild to moderate)
Datril	
Tylenol	

How to give this to the patient with pain or fever

	Dose	Instructions	Caution
<b>Adults</b>	650 mg up to 1000 mg	By mouth or rectum every 6 hrs	More than the recommended dose will cause liver failure
<b>Children</b>	150 mg		
<b>Infants</b>	37.5-75 mg		

## Penicillin G (PCN-G)

This drug is also called...	Use this medicine to treat...
Pentids	Meningitis
Crystapen	Sepsis
	Pneumonia

How to give this to the patient with sepsis or meningitis

	Dose	Instructions	Caution
Adults	24 million units	IM every 4 hours	Allergic reactions can include rash, facial swelling, and shortness of breath Discontinue immediately and give Diphenhydramine if allergic reaction occurs
Children	6-12 million units		
Infants	6-12 million units		

## Penicillin V (PCN-VK)

This drug is also called...	Use this medicine to treat...
Betapen-VIC	Meningitis
Pen-vee	Sepsis
Veetids	Pneumonia
V-cillin	

How to give this to a patient with meningitis, pneumonia, or sepsis

	Dose	Instruction	Caution
Adult	500mg	By mouth 4 times a day	Discontinue immediately and give Diphenhydramine if allergic reaction occurs
Children	250mg		
Infant	125mg		

## Phenobarbitone = barbituate, anticonvulsant (pill size: 30 mg, 60 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Phenobarbitol	Epilepsy	Primidone
	Status epilepticus	

How to give this to a patient with epilepsy...

	Dose	Instruction	Caution
Adult	30 mg, can increase to 90 mg a day	By mouth or rectum at bedtime. The average dose required will be 3mg/kg per day.	Causes sleepiness In high doses drug can cause coma & death
Children	15 mg, can increase to 60 mg a day		
Infant	7.5 mg, can increase to 30 mg a day		

How to give PHENOBARBITONE to the patient with status epilepticus...

	Dose	Instructions	Caution
<b>Adult</b>	Approximately 500 mg	By injection, mouth or rectum. Repeat in 1 hour if patient is still in status and respiratory rate is at least 10 breathes/minute	High doses cause respiratory failure
<b>Children</b>	Approximately 250 mg		
<b>Infants</b>	Approximately 75-125 mg		



To determine size of dose: 10 mg/kg (for example, if patient weighs 25 kg, then give 250 mg (just add a zero). Repeat this dose in 1 hour. The average adult weighs 50 kg

### Phenytoin = anticonvulsant (pill size: 300 mg)

This drug is also called...	Use this medicine to treat...
Dilantin	Seizure

How to give this to the patient-

	Dose	Instructions	Caution
<b>Adults</b>	300 mg	By mouth daily	If rash develops, stop phenytoin Good oral care is needed. Refer to a dentist if available.
<b>Children</b>	75-150mg		
<b>Infants</b>	<b>DO NOT USE</b>		In women who may become pregnant, you must also give MVI or folate supplement when giving phenytoin.

### Primidone = barbituate, anticonvulsant (pill size: 250 mg, 100 mg, 500 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Mysoline	Epilepsy	Phenobarbitol
	Tremor	

How to give this to the patient with epilepsy

	Dose	Instructions	Caution
<b>Adults</b>	500-1000 mg	By mouth daily	Causes sleepiness Overdose can cause coma and death Start at lowest dose and increase slowly over 1 month.
<b>Children</b>	125-250 mg		
<b>Infants</b>	65.5-125 mg		

## Prochlorperazine (pill size: 10 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Compazine	Nausea	Promethazine Diphenhydramine

How to give this to the patient with nausea...

	Dose	Instructions	Caution
<b>Adults</b>	5-10 mg	By <u>mouth</u> every 12 hours	Causes sleepiness Do not use in children under 5 years
	25 mg	By <u>rectum</u> every 12 hours	
	5-10 mg	By <i>injection</i> every 8 hours	
<b>Children</b>	2.5 mg	By mouth, rectum or injection every 12 hours	

## Promethazine = anti-emetic (pill size: 25 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Phenergan	Nausea	Prochlorperazine Diphenhydramine
	Inflammation	

How to give this to the patient with nausea...

	Dose	Instructions	Caution
<b>Adults</b>	25-50 mg	Every 4-6 hours	Causes sleepiness
<b>Children</b>	12.5-25 mg		
<b>Infants</b>	6 mg		

## Propranolol = beta blocker (pill size: 20 mg, 40 mg, 60 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Inderol	Migraine	Metoprolol Atenolol
	Hypertension (high BP)	

How to give this to the patient with migraine...

	Dose	Instructions	Caution (stop if)
<b>Adults</b>	40 mg Can increase up to 80 mg 2 times a day over several weeks	By mouth 2 times a day	Can cause shortness of breath. Stop if patient develops wheezing or shortness of breath. Do not give to asthmatics. Can cause sexual problems in men Stop this drug if patient becomes pregnant.

## Pyridoxine = B vitamin (pill size: 25 mg, 50 mg)

This drug is also called...	Use this medicine to treat...	It is like...
Vitamin B6	Vitamin deficiency that can occur with INH use	B Complex vitamin

How to give this to the patient on TB medicines or with a neuropathy from TB medicines...

	Dose	Instructions	Caution
<b>Adults</b>	50 mg	By mouth each day	Do not take more than recommended dose. High doses cause neuropathy due to toxicity
<b>Children &gt;5 years old</b>	25 mg		
<b>Infants &lt;5 years old</b>	12.5 mg		

## Quinine (pill size: 300 mg)

This drug is also called...	Use this medicine to treat...
	Malaria (severe)

How to give this to the patient with malaria...

	Dose	Instructions	Caution
<b>Adults</b>	600 mg	By mouth or injection every 8 hours for seven days. For IV administration, mix with glucose-containing IV fluid. For IM injection, mix with equal quantities of sterile water.	Causes ringing in ears. Also causes blood sugar to drop. Be certain to give with some form of sugar too.
<b>Children</b>	150-300 mg		
<b>Infants</b>	75-150 mg		

*For severe infections the initial dose is 20mg/kg over 4 hours IV then 10mg/kg every 8 hours*

## Septim = trimethoprim/sulfamethoxazole (TMX/SUL)

This drug is also called...	Use this medicine to treat...
Septra	Infection
Bactrim	Meningitis
	Sepsis
	Malaria on CHLOROQUINE

How to give BACRTIM TO the patient with meningitis...

	Dose	Instructions	Caution
<b>Adults</b>	1-2 pill	By mouth every 12 hours	Stop if patient develops rash. Do not use in infants less than 2 months old
<b>Children</b>	1-½ pill		
<b>Infants</b>	½-¼ pill		



## Tetracycline = antibiotic (pill size: 250 mg, 500 mg)

This drug is also called...	Use this medicine to treat...
Achromycin	Infections
Sumycin	Syphilis
	UTI
	Brucellosis

How to give this to the patient with sepsis or meningitis...

	Dose	Instructions	Caution
Adults	1000 mg	By mouth	Don't give to pregnant women or children under 5 years old
Children	250-500 mg	every 6 hours	

## Valproic acid = anticonvulsant (pill size: 250 mg, 500 mg)

This drug is also called...	Use this medicine to treat...
Valproate	Epilepsy.
Depakote	Migraine
Depakene	
Divalproex	

How to give this to the patient with migraine or epilepsy...

	Dose	Instructions	Caution
Adults	250-500 mg	By mouth 4 times a day	Can cause rash. If patient develops rash, stop medicine. Do not use in children under 5 years old
Children	125-250 mg		

## Verapamil = calcium channel blocker

This drug is also called...	Use this medicine to treat...	It is like...
Calan	HTN	Nifedipine
Isoptin	Migraine (prophylactic)	

How to give this to the patient with migraine...

	Dose	Instructions	Caution
Adults	40-80 mg	By mouth 3 times a day	Do not use with beta-blockers Atenolol, Metoprolol, Propranolol are beta-blockers

## Glossary of Terms

**Abnormal**-not normal, sick

**Abortive** (as in migraine medicine)-a pain medicine given to migraine patients only when they have a headache

**Alcoholic drink**-drinks like beer and whisky that contain alcohol and can cause drunkenness

**Alphabetically** listing words or names by the first letter starting the word or name beginning with “A” and going all the way to “Z”

**Aphasia**-speech problems that are not simply due to problems in the mouth or tongue but are related to brain problems. Aphasia prevents the patient from being able to speak

**Artery**-thick-walled blood vessel that carries blood from the heart to the rest of the body

**Bell’s Palsy**-benign paralysis of one side of the face which includes weakness of the forehead and is not associated with hemiparesis or zoster ear infections.

**Cerebral palsy**-brain disorder beginning in early childhood or infancy

**Chronic**-long term, not acute

**Coma**-depressed level of consciousness, deep sleep from which patient cannot be aroused

**Cord compression**-spinal cord injury due to squeezing of cord by bone abnormality, ruptured disc, or other problem

**Cranial nerves**-nerves that travel from the brain to the head, neck and face

**Defecation**-having a bowel movement, passing stool, pooping, shitting

**Dehydration**-low blood volume from lack of fluid (water) in the blood

**Diagnose**-to give a patient’s problem a name; this is different than just writing down their complaint. For example, “shortness of breath” is a complaint; “pneumonia” is a diagnosis. When we give a diagnosis, it usually means we have some understanding of the problem. We do not always have a diagnosis.

**Differential diagnosis**-some of the different problems a patient might have that could explain their complaints and examination findings

**Downs syndrome**-an abnormality present from birth associated with mental retardation, a dysmorphic face, and sometimes other birth defects



**Dysmorphic**-unusual or strange looking face

**Dysphasia**-speech problems related to weakness or clumsiness of the mouth or tongue. Also see "Aphasia"

**Eclampsia**-seizures during pregnancy usually associated with high blood pressure

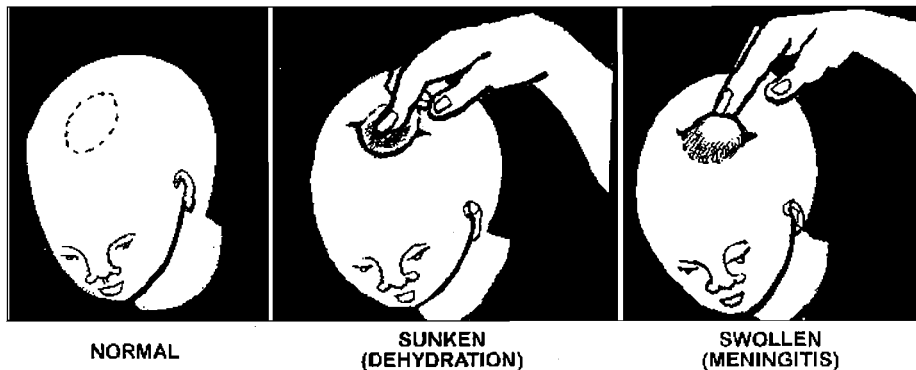
**Endemic**-disease or problem that exists year round, not just during a particular season

**Epilepsy**-more than one seizure, recurrent seizures unrelated to fevers

**Febrile seizure**-a fit or convulsion that occurs in children due to very high body temperatures; a child **MUST** have a fever at the time of the fit to call it a febrile seizure; febrile seizures **ARE NOT** the same as epilepsy

**Focal**-limited to one region or area

**Fontanel**-an opening in the skull of a baby where the bones have not yet grown together; also called the soft spots



**Goiter**-abnormally large thyroid gland often caused by poor iodine in the diet



**Hemiparesis**-weakness on one side of the body so that the arm and leg on that side are weak; the face may also be weak.

**Hypertension**-high blood pressure; hypertension can eventually cause heart problems and stroke

**Hypoglycemia**-low blood sugar

**Hyperthermia**-high body temperature (more than 38.2 degrees Celsius)

**Hypothermia**-low body temperature (less than 36.8 degrees Celsius)

**Level-of-consciousness**-a description of how awake or unconscious a patient is

**Lumbar puncture**-also called a spinal tap; a procedure in which the doctor places a needle in the lower back of a patient to withdraw fluid; this fluid is *cerebrospinal fluid* or CSF and circulates around the spinal cord and brain; the doctor can look at CSF under a microscope and tell if the patient has meningitis

**Macrocytic**-large blood cells

**Meninges**-leathery skin inside the skull that covers and protects the brain

**Meningitis**-an infection in the thick covering over the brain (the meninges); patients with meningitis usually have a stiff neck and high fevers; to diagnose meningitis doctors usually do a *lumbar puncture*

**Mental retardation**-mentally slow or subnormal

**Migraine**-recurrent headaches; migraines are common in women and are often associated with visual abnormalities, which occur before the headache

**Motor nerves**-nerves that carry messages from the brain telling the body to move

**Narcotic**-strong pain medicines

**Nervous system**-the brain, spinal cord and nerves

**Neurologist**- a doctor who has received special training to take care of people with problems related to the brain, spinal cord, and nerves

**Neurology**-study of the brain, spinal cord and nerves

**Neuropathy**-problem due to damaged or sick nerves

**Organophosphate**-chemical that is used to kill insects in crops; organophosphates can be toxic to humans; sometimes called "bug medicine"

**Palate**-the back of the throat that looks like the letter "M"

**Paraparesis**-weakness in the legs

**Paresis**-focal weakness; weakness affecting only one region of the body; for example, paresis could affect one limb, one side of the body, one side of the face

**Peripheral nerves**-small nerves to face or body from the spinal cord

**Phonophobia**-pain caused by normal levels of sound

**Photophobia**-pain caused by normal levels of light

**Plegia**-severe, complete paralysis

**Point tenderness**-great pain when a very small area of the body is pressed or pushed

**Post-concussive syndrome**-headaches and personality changes that can occur after mild head injury

**Potts disease**-tuberculosis of the spine

**Projectile**-shooting out

**Prophylactic** (as in migraine medicine)-a medicine taken every day even if the patient does not have a headache; over time, prophylactic drug will decrease the frequency and severity of headaches

**Prophylaxis**-to give medication in order to prevent problem

**Proprioception**-your sense of where your arms and legs are

**Pupil**-the dark, black center of the eye; the pupil can be very hard to detect in someone with dark eyes

**Quadripareisis**-weakness in all 4 limbs (both arms and legs)

**Recurrent**-over and over again

**Retroviral disease**-a type of virus; causes AIDS

**Seizures**-Fits or convulsions from unhealthy brain activity; loss of consciousness, usually with shaking or strong movements that result from abnormal brain activity

**Sensory nerves**-nerves that carry messages from the body to the brain telling you what you feel, smell, taste, touch, hear, and see

**Sepsis**-severe infection in the whole body through the blood stream

**Spasticity**-tightening of muscle due to brain or spinal cord injury

**Status epilepticus**-a prolonged seizure or more than one seizure during which the patient does not wake up within 30 minutes

**Subtle seizure**-small movements or behaviors caused by seizure

**Toxins**-substances that can act as poisons to the body; some toxins are only poisonous if eaten or drunk; others can be absorbed through the skin

**Urinating**-passing water, peeing, pissing

**Vein**-small, thin-walled blood vessel that carries blood back to the heart from the body

**Visual auras**-visual changes with lines or flashing lights that can happen before migraine headaches

## Abbreviations

**AIDS**-autoimmune deficiency syndrome; sometimes called retroviral disease

**ARV**-antiretroviral; drug used to suppress the HIV virus and treat AIDS

**BP**-blood pressure

**CMV**-cytomegalo virus

**CNS**-central nervous system

**GBS**-Guillain Barre Syndrome

**HIV**-human immunodeficiency virus; also called retroviral disease; the HIV virus causes AIDS

**HCL**-hydrochloride, hydrochloric acid

**HR**-heart rate

**HTN**-hypertension, high blood pressure

**IM**-intramuscular

**IV**-intravenous

**MP**-malarial parasites (scored 0-5 from thick blood smear)

**NGT**-nasogastric tube

**NSAID**-nonsteroidal anti-inflammatory drug

**PCN**-penicillin

**PID**-pelvic inflammatory disease

**PO**-per os; oral; by mouth

**PR**-per rectum

**RPR**-rapid plasminogen reagent (tests for syphilis)

**RR**-respiratory rate

**RTI**-respiratory track infection

**SQ**-subcutaneous

**STD**-sexually transmitted diseases

**TCA**-tricyclic antidepressant

**Temp**-temperature

**TB-tuberculosis**

**UTI-urinary tract infection**

**Appendix 1: Recording the neurologic examination**

Date: \_\_\_\_\_

Patient's Name: \_\_\_\_\_

Patient's Complaint: \_\_\_\_\_

How long has this problem been going on? \_\_\_\_\_

This problem is...    getting better            getting worse            staying the same  
(circle)

**Vital Signs**

BP	HR♥	Temp	RR

LOC: \_\_\_\_\_

Speech: \_\_\_\_\_

**Cranial Nerves:**

Vision    Smile    Facial Sensation    Eyes

**Motor Function**  
(The patient is weak here...)

**Sensory Function**  
(The patient is numb here...)



**Appendix 2: Head Injury Observation Sheet-**

**Patient Name:** \_\_\_\_\_

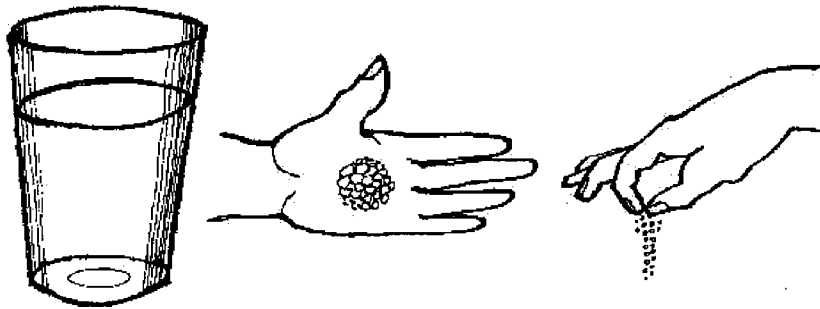
**Date:** \_\_\_\_\_

**Start Time-** \_\_\_\_\_ **(record time, then add the expected time for each exam)**

Findings-	Hour #2 _____	Hour #4 _____	Hour #6 _____	Hour #8 _____	Hour #10 _____	Hour #12 _____
GCS/BCS						
Vomiting?						
Awakens easily?						
Vital Signs-						
Exam findings-						
	Hour #14 _____	Hour #16 _____	Hour #18 _____	Hour #20 _____	Hour #22 _____	Hour #24 _____
GCS/BCS						
Vomiting?						
Awakens easily?						
Vital Signs-						
Exam findings						

### Appendix 3

To make oral rehydration solution (ORS) –



**WATER + SUGAR + SALT**

☞ Taste it yourself. ORS should taste no saltier than tears.