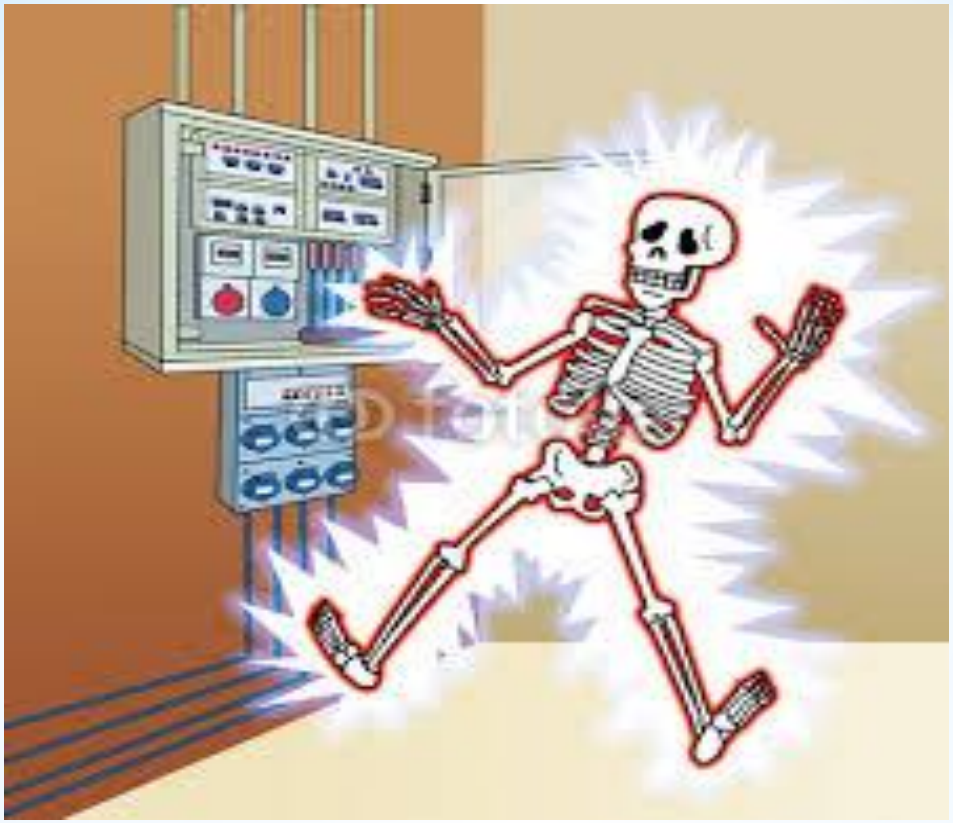


*ELECTRIC SHOCK

* A shock is a pain full stimulus of sensory nerves which is caused by a sudden flow, cessation or variation in the intensity of current passing through the body
* Motor nerves may be stimulated causing muscle contraction

*The severity of shock

*The greater is the intensity of current, the more sever is the shock

*According to Ohm's law, The current intensity depends on

1. EMF
2. Resistance

***High EMF**, lager will be the intensity of the current

*So apparatus used for patient are kept at low EMF i.e.

*For d.c. It is not more than 75 volts

*N for muscle stimulating currents __ 110 to 130 volts

***High Resistance** , reduces the intensity of current

*Exposed part of circuit, touched with dry hands/ wet hands

* **Path taken by the current flow:**
* High intensity current through head, neck, heart or whole body prove fatal
* **A.C or D.C.**
* A.C. is more sever, as continuously changing polarity causes more sensory stimulation, titanic muscle contraction, impossible for the victim to let go of the conductor

Effects of shock

* **Following minor shock**
* Frightened
* Distressed
* Not loss consciousness
* **After more sever shock**
* Fall of blood pressure
* Loss of consciousness
* **In extreme cases**
* Cessation of respiration___ lack of respiratory movements & cyanosis
* Cardiac arrest___ absence/ abnormal resp. movt. Absence of carotid pulse, fully dilated pupils

Treatment of shock

* **First step:**
* Remove the victim from the source of supply
* A.C. must be switch off at once
* But D.C./unvarying disconnected slowly, as sudden cessation can cause a second shock
* If no switch in the circuit, the victim must be removed from the contact, with great care
* Contact with the affected person should be made only through a thick layer of insulating material

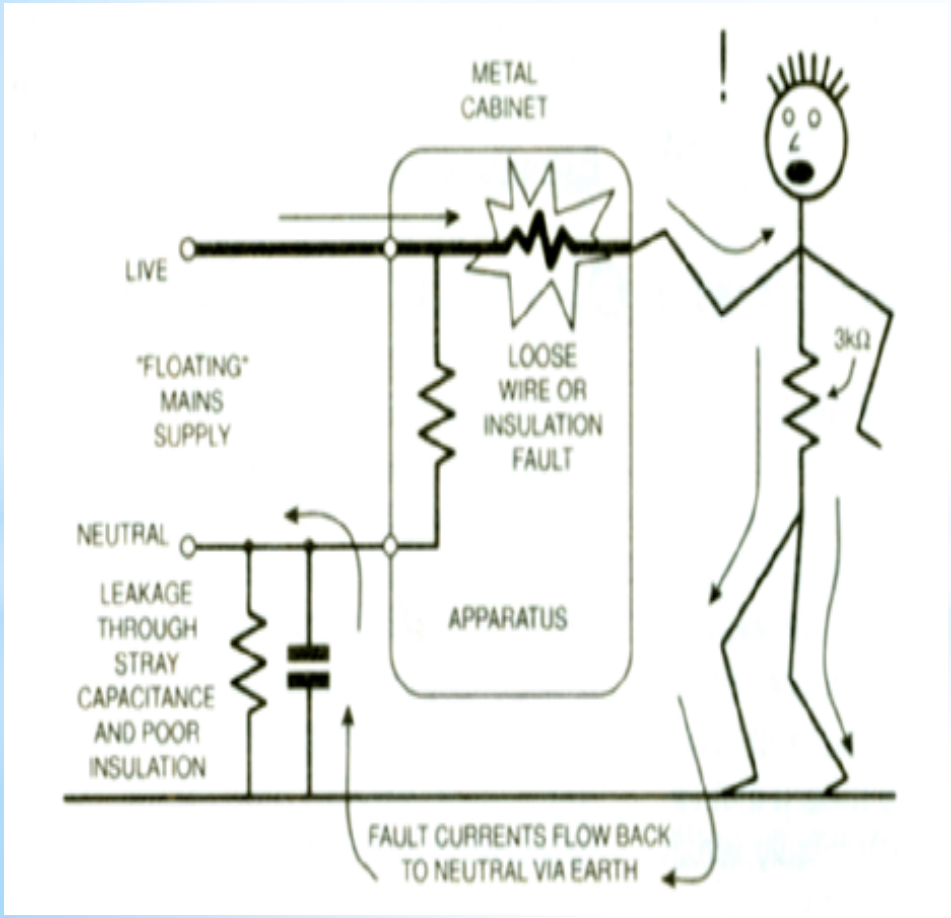
* **Following a minor shock:**
* Reassured the patient
* Ask to rest
* Give water to drink
* Avoid hot drinks as they cause vasodilatation and further fall in blood pressure
* Better to consult a medical officer

* **Following a more sever shock:**
* Lay the victim flat so that respiratory passages are clear
* Tight clothing is loosened and plenty of air allowed
* Undue warmth is avoided(vasodilatation _ fall in BP) also external heat increases metabolism, and increase the demand of oxygen
* If patient is unconscious , nothing is given by mouth, a medical officer is called without delay
* If respiration has ceased, air ways should be clear and artificial respiration is commenced
* If cardiac arrest is occurred, external cardiac massage must be applied
* The most important is to call the medical emergency

*Causes of shock

*A patient may receive a shock in the course of an electrical treatment is a result of a sudden increase in the intensity of current

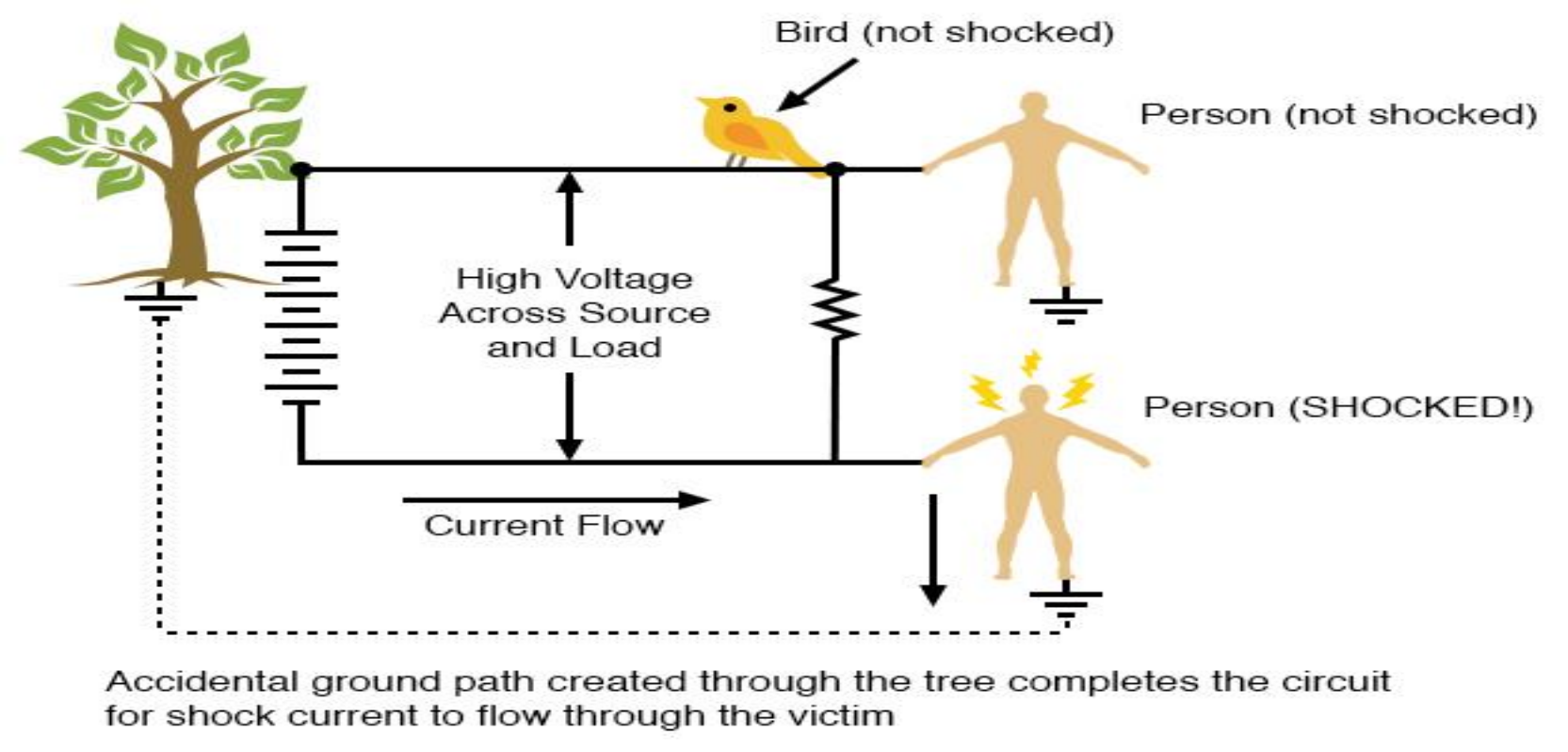
1. Direct and LFC is switched on with the controls turns up
2. If insufficient time is allowed to warm up current come suddenly
3. Intensity control is turned up unduly during the interval of current flow
4. If there is a fault in the apparatus
5. Patient touches the exposed part of circuit
6. Sudden cessation of DC


METAL
CABINET
LIVE
"FLOATING"
MAINS
SUPPLY
LOOSE
WIRE OR
INSULATION
FAULT
3kΩ
NEUTRAL
LEAKAGE
THROUGH
STRAY
CAPACITANCE
AND POOR
INSULATION
APPARATUS
FAULT CURRENTS FLOW BACK
TO NEUTRAL VIA EARTH

Precautions

- All apparatus must be tested before used, connection checked
- Check controls that they are at zero before switching on
- Adequate warm up time and intensity increase accurately
- Patient should not allow to touch the apparatus
- Apparatus should be serviced regularly
- Physiotherapist may receive a shock while handling the equipment, so be careful when ever connections are made or removed

* when a shock is due to a connection between the live wire of the main and earth, is known as earth shock

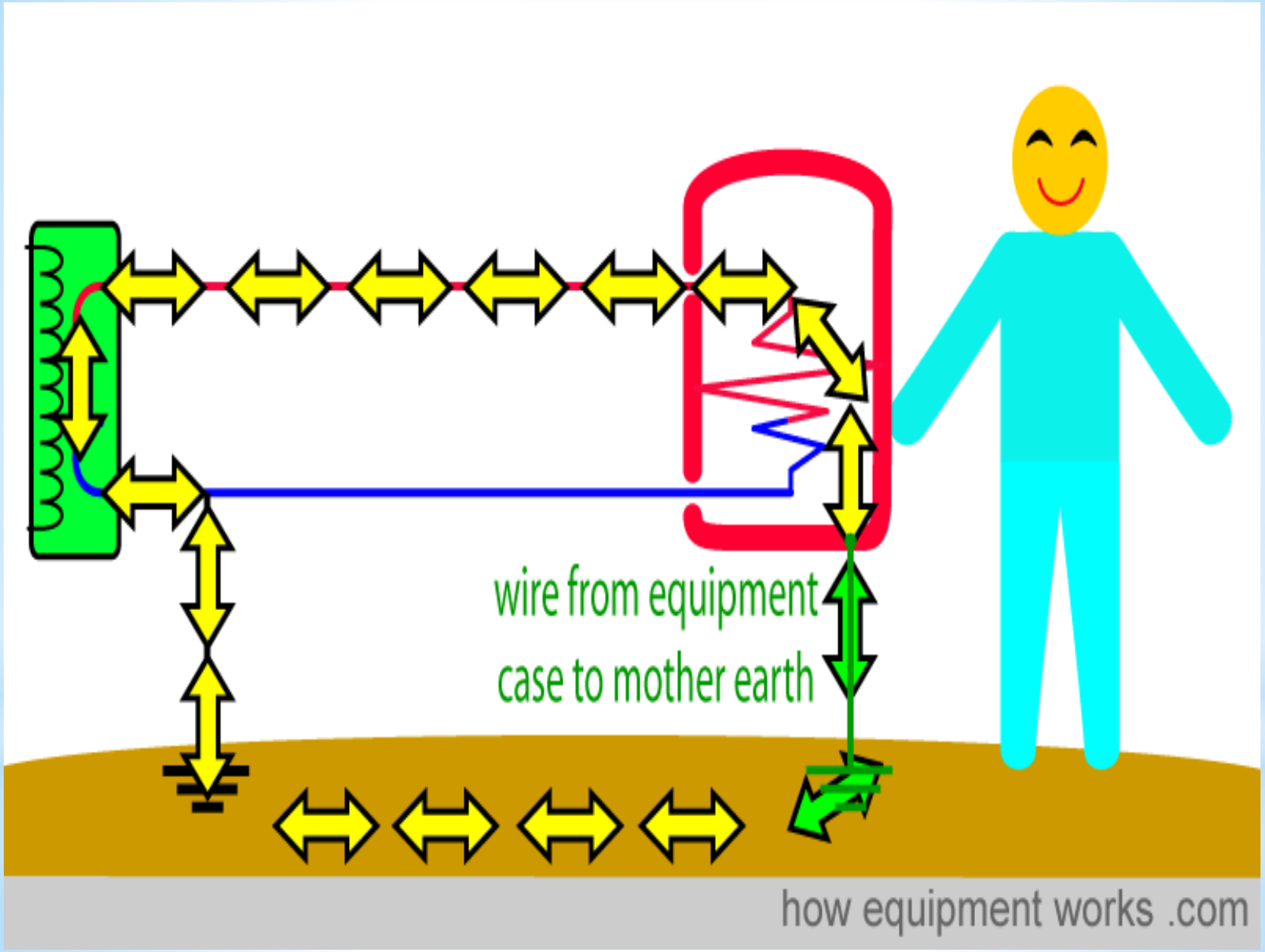


Accidental ground path created through the tree completes the circuit for shock current to flow through the victim

* Earth shock

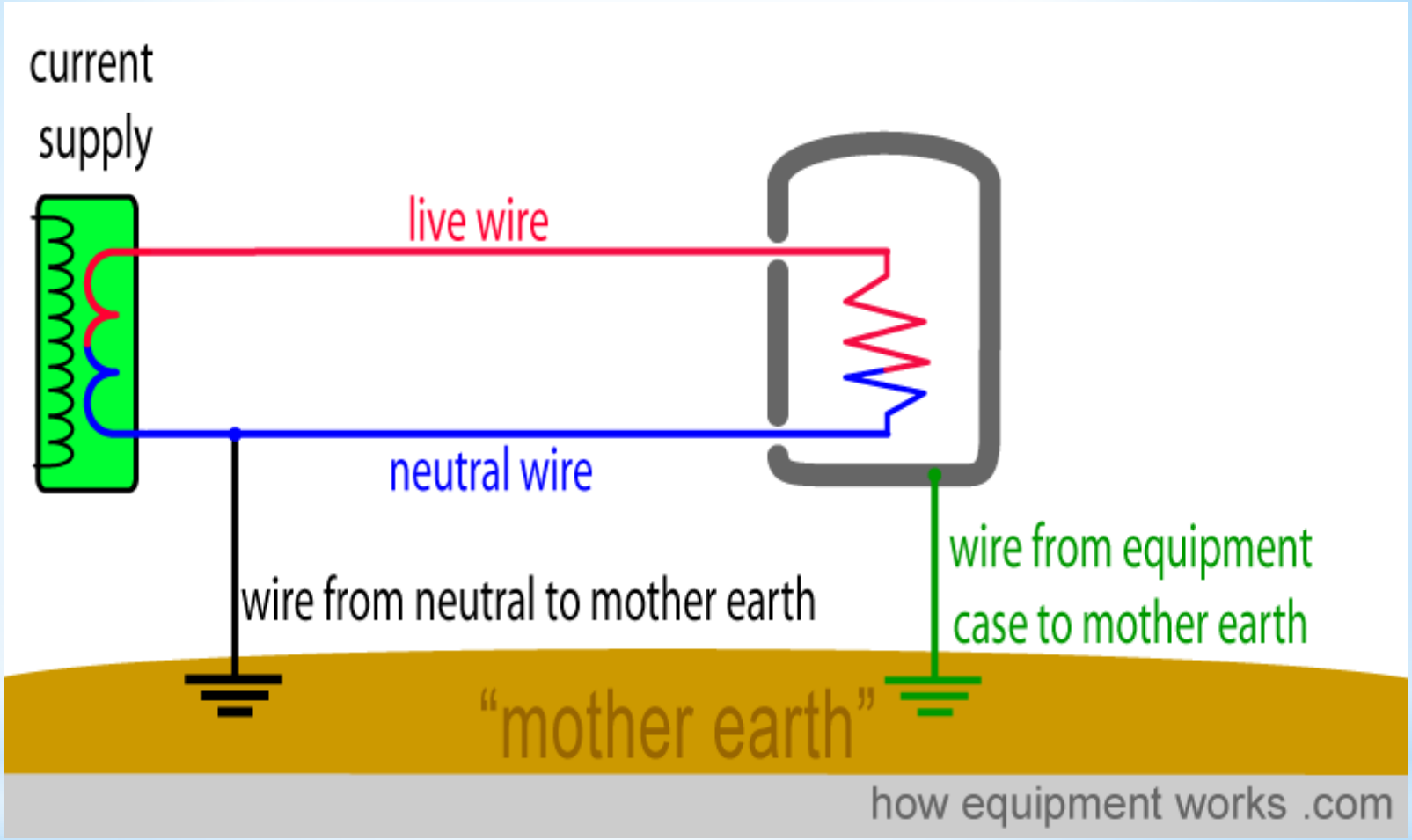
The earth circuit

* Electric power is transmitted by one live cable and neutral cable which is connected to the earth.
* The earth form the part of conducting pathway and any connection between the live wire of main and earth completes a circuit through which current passes.
* If some person forms part of this circuit he receives an earth shock


wire from equipment
case to mother earth
how equipment works .com

Connection to the live cable

* A patient who is receiving treatment with a current that is not earth free is connected to the cable
* If patient touches exposed part of apparatus and if switch breaks only the neutral wire
* Insulation of live wire is faulty and it come in contact with some metal part of apparatus, casing etc.


current
supply
live wire
neutral wire
wire from neutral to mother earth
wire from equipment
case to mother earth
"mother earth"
how equipment works .com

Connection to earth

* Touching any conductor which is connected to earth
* Like gas or water pipes, stone floors etc. particularly if they are damped
* A metal bed on such a floor is also dangerous, if it make connection with exposed live wire too

*Examples of earth shock

*Simultaneous connections to the live wire and to the earth can occur in a variety of way, e.g,

1. A patient who is receiving treatment with earth free current rest her hand on water pipe
2. Physiotherapist holding an electrode which is connected to the live wire touches the earthed apparatus casing
3. Person standing on a damp stone floor, touching the apparatus which is in contact with live wire

*Precautions

* Physiotherapy department should be arranged so that there is minimal dangers of making an earth connection while in contact with apparatus
* Water and gas pipes should be out of the reach of apparatus and patients
* Floor should be of insulating material and kept dry
* If floor is not of insulating material, rubber mat or rubber shoes should be used
* Switches must break the live wire and fuses should be on live wire
* Patient not touches the apparatus, especially when using water bath method, and bath tub should be of insulating material
* Water should not be added during treatment
* Current used must be earth free
* Cells provide earth free currents
* Ensure the quality of apparatus while purchasing

*Thanks