Effect of High frequency Current on the Tissues

The major effect of passing current of sufficient intensity at frequency above one megahertz (1MHz) is to cause heating.
Anything that increases the internal kinetic energy of matter causes heating

1.) Vibration of Ions :- The tissue contain large number of ions ; if an electric field is applied first in one direction, then in another direction, the ions will be accelerated first one way, then opposite way colliding with adjacent molecules to give up some energy to them. So, increasing the total random motion i.e., heat.

3.)

As the frequency of SWD is very high. the result is vibration rather than actual movement of ions

2) Dipole Rotation :- The tissue contains large amount of water that contain dipoles, which are molecules consisting of two oppositely charged ions. The particle as a whole is electrically neutral but one end bears a negative and other end has a positive charge.

When rapidly reversing charges are applied to polar molecules that will rotate to and foo. This rotational energy disrupts the motion of adjacent molecules causing more random motion and hence heat.

3) Molecular Distortion :- Atoms and molecules which are not charged can also be affected by rapidly oscillating electrical field.
In that the paths of their orbiting electrons are distorted.
As the charges on electrodes alternate, the electron orbits swings first to one side and then to the other and the molecules are distorted.

This does not cause motion of the molecules but the interaction with the other neighbouring molecules leads to more random motion and therefore, some heating.

Physiological Effects