

Pulsed ultrasound  $\Rightarrow$  The circuit in the generator is arranged to turn the ultrasound on for short <sup>burst</sup> dose of pulses. This reduces the time average intensity and hence the amount of energy available to heat the tissue.

Therapeutic ultrasound generator produces  $\approx$  millisecond pulse and vary the interval between pulse. This could be expressed as

$\rightarrow$  The mark: space (ratio) which is the ratio of pulse length to the interval.

$\rightarrow$  The duty cycle is the ratio of pulse length to the total length of pulse interval.

Effects of pulsing  $\Rightarrow$  If the pulsed ultrasound is applied at a mark space ratio of 1:4 the amount of introduced energy is  $\frac{1}{5}$ th of that which would be introduced by continuous ultrasound applied for the same length of time and same the intensity.

The same amount of energy would be introduced into the tissue either by extending the treatment for 5 times the length of time or giving 5 times intensity of the continuous treatment.

Physiological and physical effects  $\Rightarrow$

→ Thermal effect : if local temperature is raised to between  $40^{\circ}\text{C}$ - $45^{\circ}\text{C}$  hyperemia will result. Temperature above  $45^{\circ}\text{C}$  are destructive effect the tissue temperature has to be maintained between these values for at least 5 min.