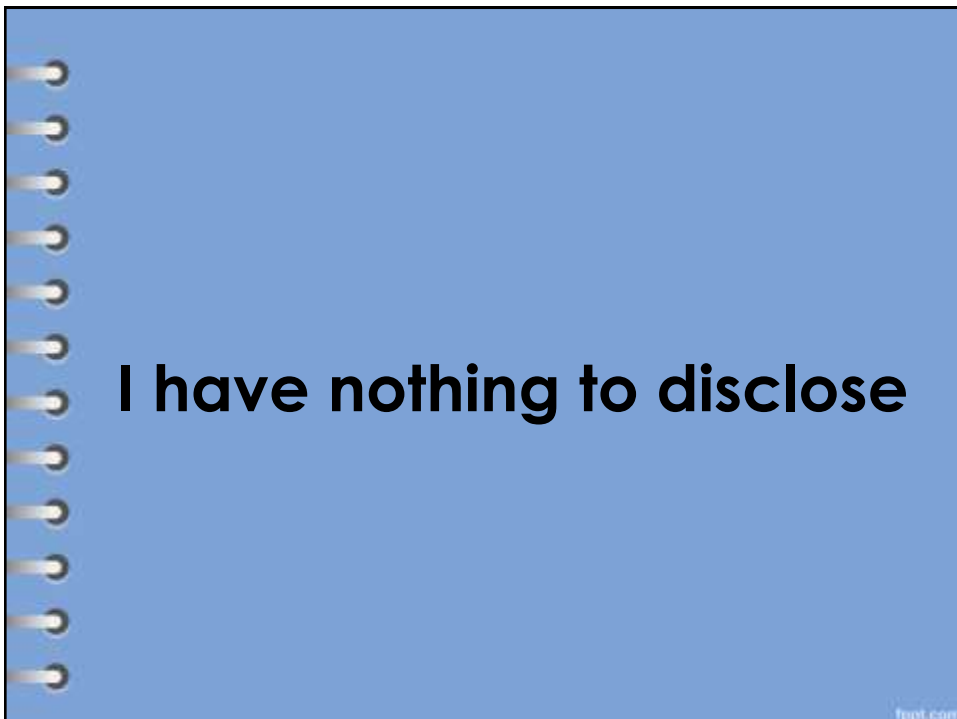
A blue spiral-bound notebook graphic with the text centered on the page. The spiral binding is on the left side.

**Phaco Fundamentals For
The Beginners**
**You Must Know Your
Machine**

Mohamed Anbar MD
Sohag University

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A blue spiral-bound notebook graphic with the text centered on the page. The spiral binding is on the left side.

I have nothing to disclose

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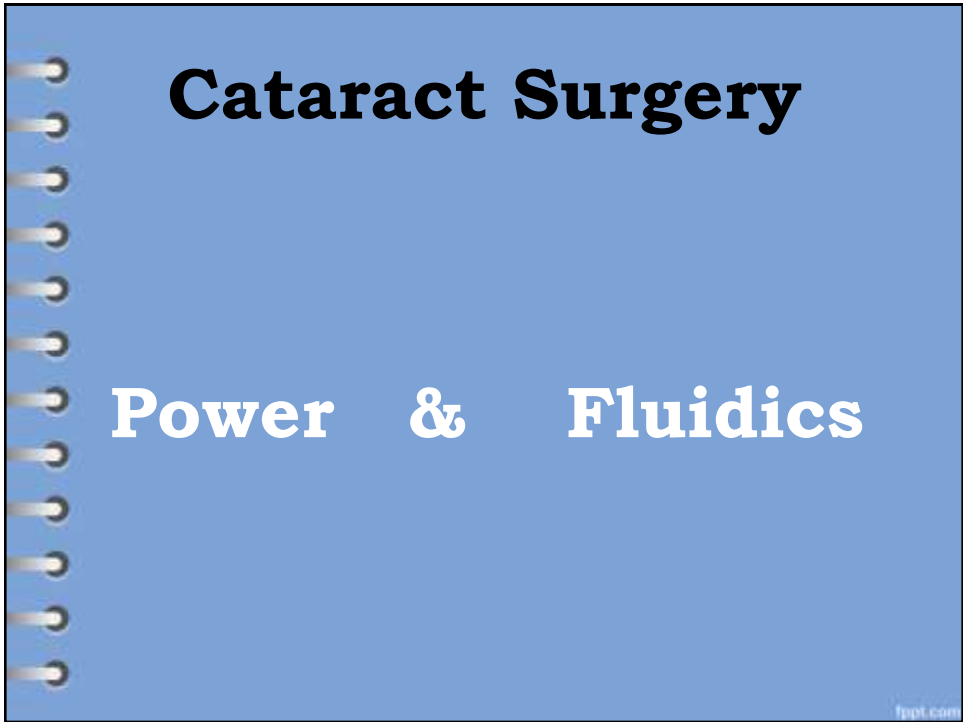
Phacodynamics

The Challenge

- Powerful enough to remove cataract
- Stable Ac
- Prevent surge
- Minimize damage to the cornea
- Minimize heat production

Cataract Surgery


Power & Fluidics

A blue spiral-bound notebook graphic with the title 'Cataract Surgery' and subtitle 'Power & Fluidics' written on it. The spiral binding is on the left side.

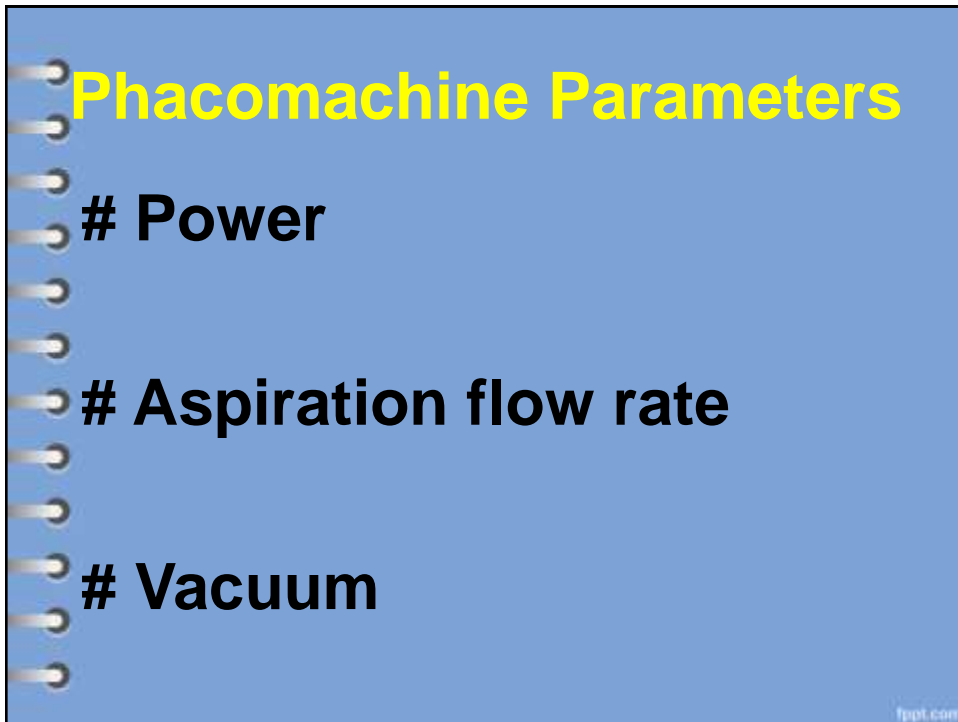
fluid.com

What the Fluidics

- # Inflow
Bottle height/ gravity,
the machine
- # Outflow
Vacuum, aspiration,
Tube size, Incisions

Two photographs illustrating fluidics. The top photo shows a clear plastic drip chamber with a single drop of liquid falling from it. The bottom photo shows a blue pipe discharging a large volume of water into a pool, creating a splash.

fluid.com

A blue rectangular area with a white spiral binding on the left side, resembling a notebook page. The text is centered and right-aligned.

Phacomachine Parameters

- # Power**
- # Aspiration flow rate**
- # Vacuum**

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A blue rectangular area with a white spiral binding on the left side, resembling a notebook page. The text is centered and right-aligned.

Power

Ultrasound Energy

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Power

Stroke Length x Frequency

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Don't use overpower



Flow

What is Flow?

The **amount** or speed at which fluid is removed from the eye

What is the importance of flow

Attract lens material to the aspiration port

Determines how **fast**

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Vacuum

Holding Force

Holds the lens matter and allow ultrasound energy to be more efficient in emulsifying.

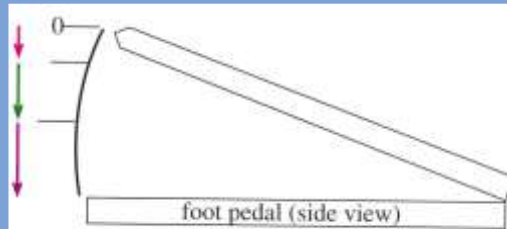
Allows **fixation** of the nucleus for chopping

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Foot Pedal



Foot Pedal

The **4** positions of the foot pedal

Position 0 = Resting

Position 1 = Irrigation

Position 2 = Active Flow and vacuum

Position 3 = Ultrasound activation

Foot Pedal

Before starting your phaco case you should know

Reflux button

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Types Of Pumps

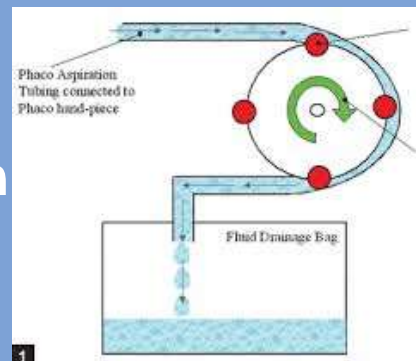
Peristaltic & Venturi

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Peristaltic pump

A peristaltic pump uses flexible tubing compressed against a rigid rotor by a series of rollers on the pump head

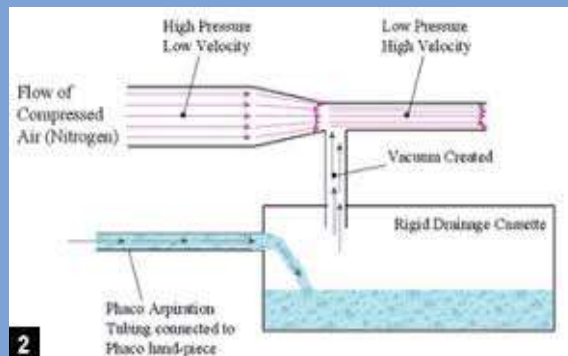
Vacuum is **occlusion** dependent



Venturi Pump

The venturi effect creates a vacuum by the flow of a fluid, typically air, over an opening

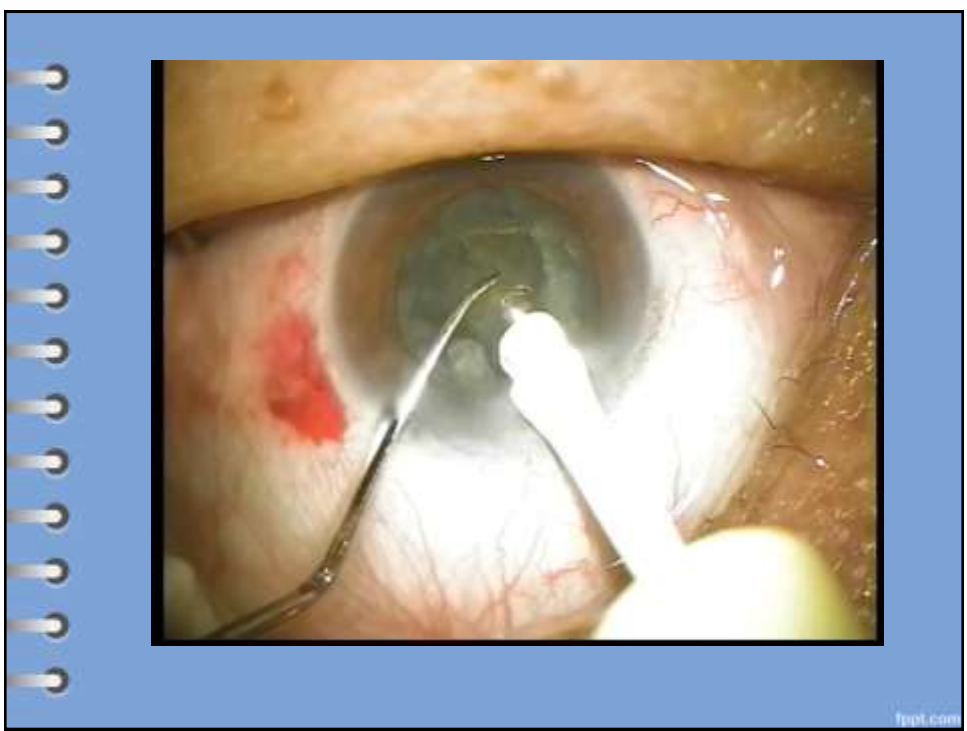
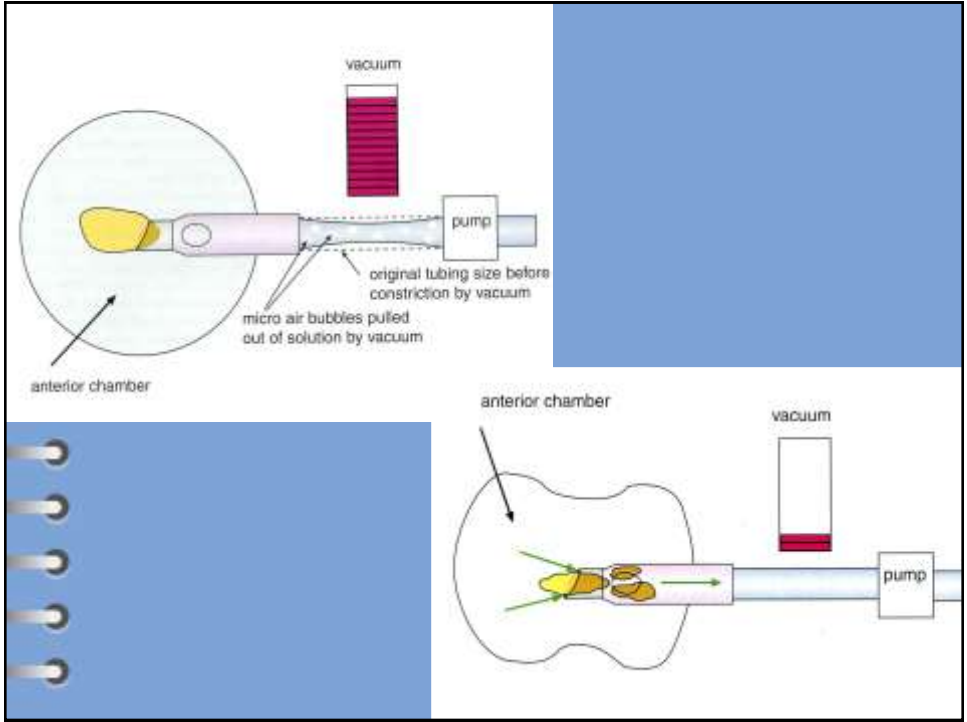
Not occlusion dependent

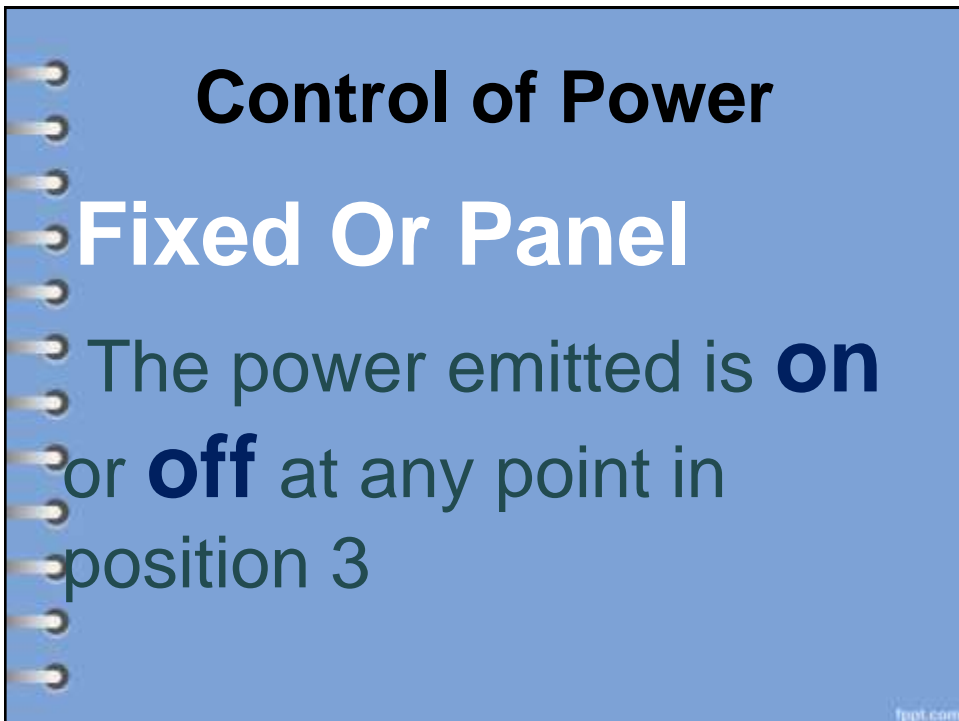
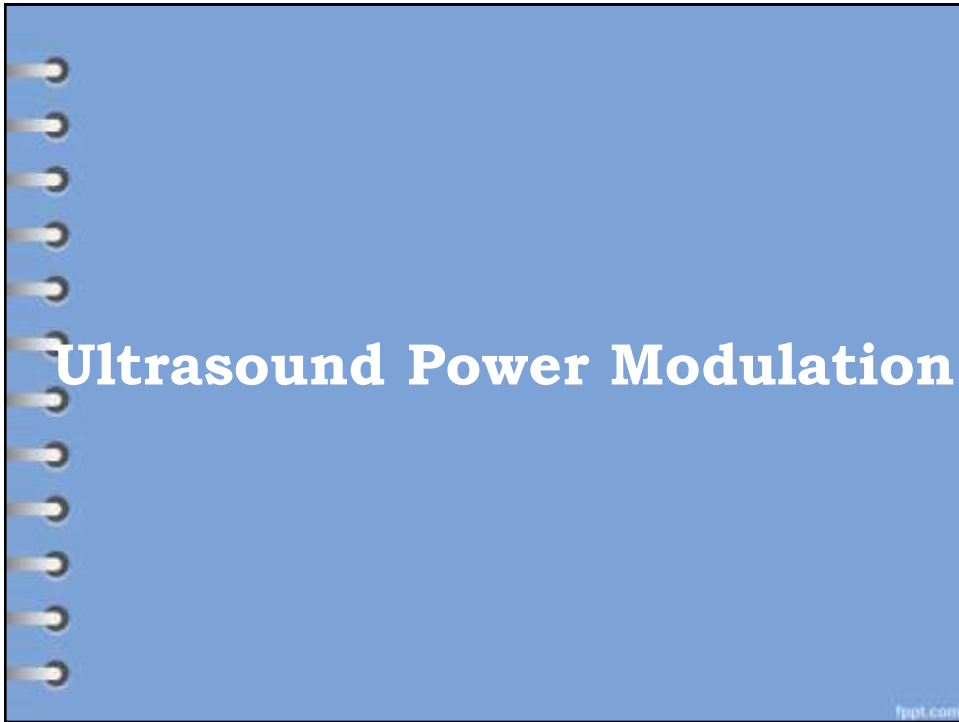




Surge

- Unstable AC during surgery after break of occlusion
- AC shallow, Dimple or even **collapse**
- This may induce damage to the cornea or the posterior capsule

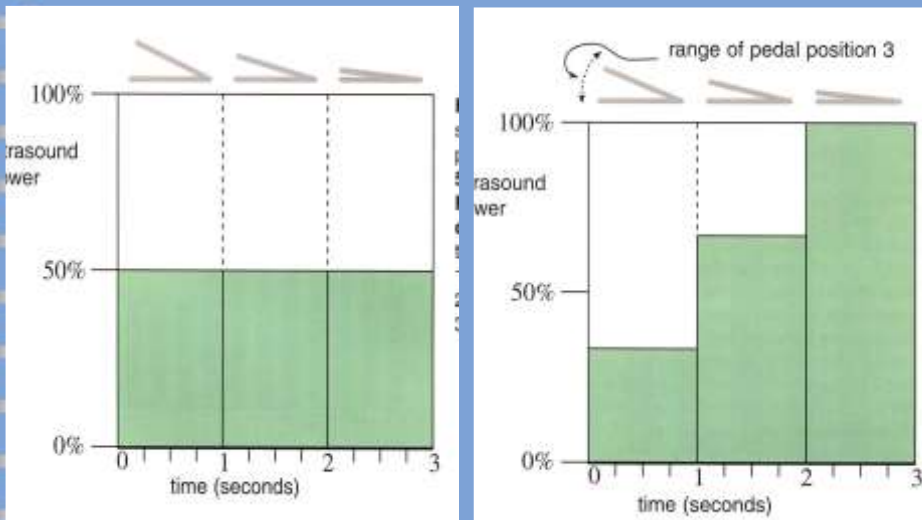




Linear or Surgeon

More power is produced as the **foot is depressed** more progressively within position 3

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Varieties Of Power

Continuous mode

POWER IS DELIVERED
CONTINUOUSLY

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Drawbacks continuous mode

Continuous will cause nuclear repulsion or shutter

Corneal endothelium damage

Thermal damage

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The introduction of **Pulse** and **Burst** modes allows interruption of ultrasound by periods of inactivity

Pulse Mode

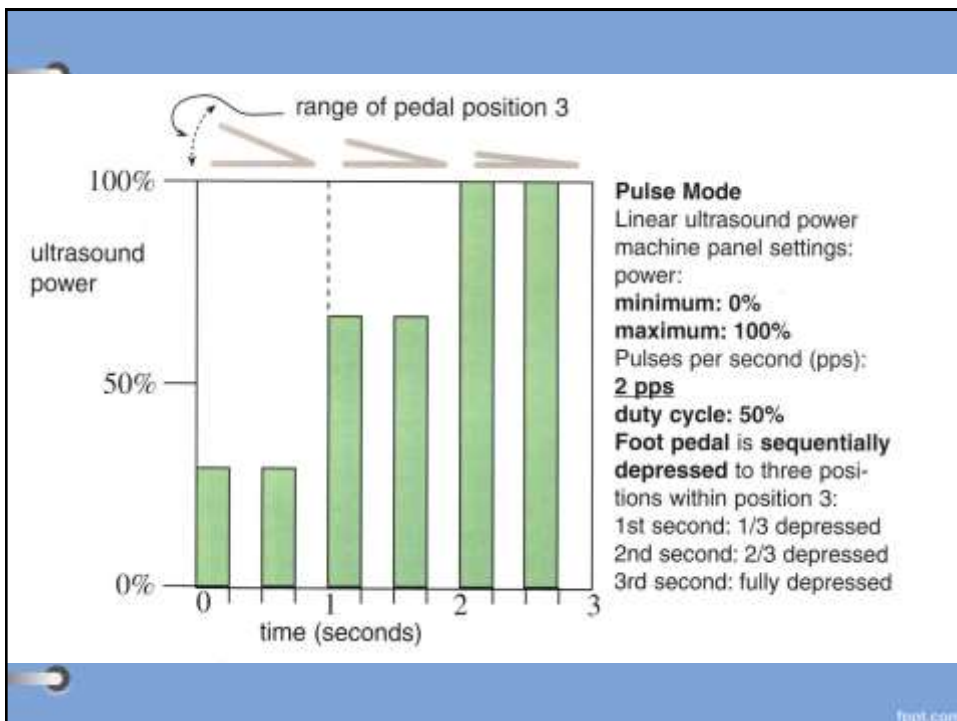
Pulse mode has typically **50% duty cycle** which means that during a given time interval in position 3, the phaco power was "on" only 50%

You can choose a **Fixed Pulses Per Second** on the machine panel

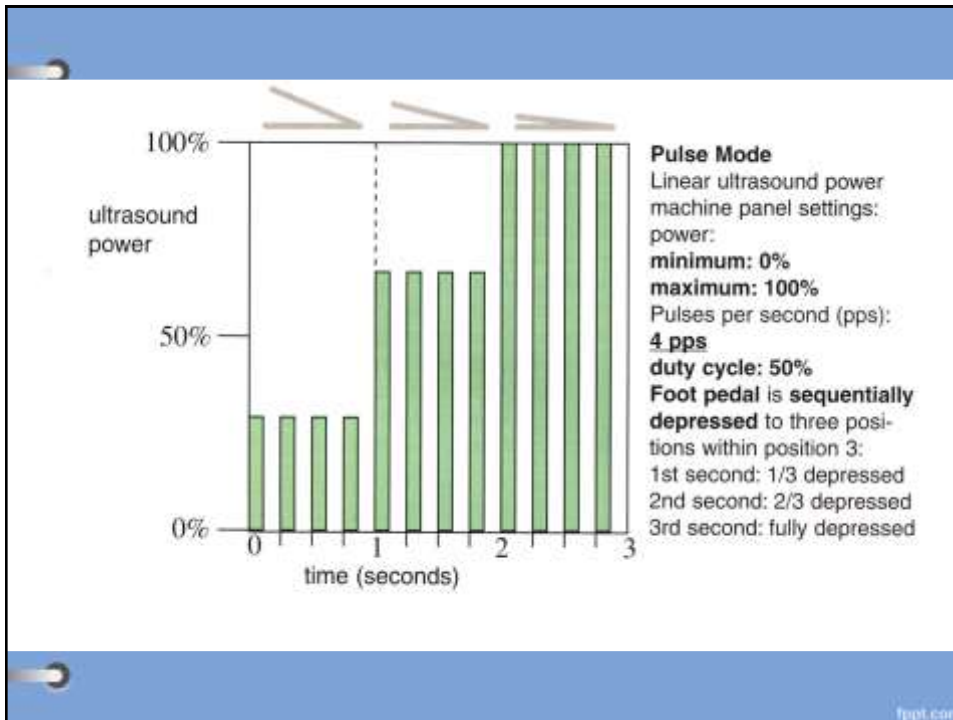
Old machine range of pulse is from 1 to 15

Pulse Mode

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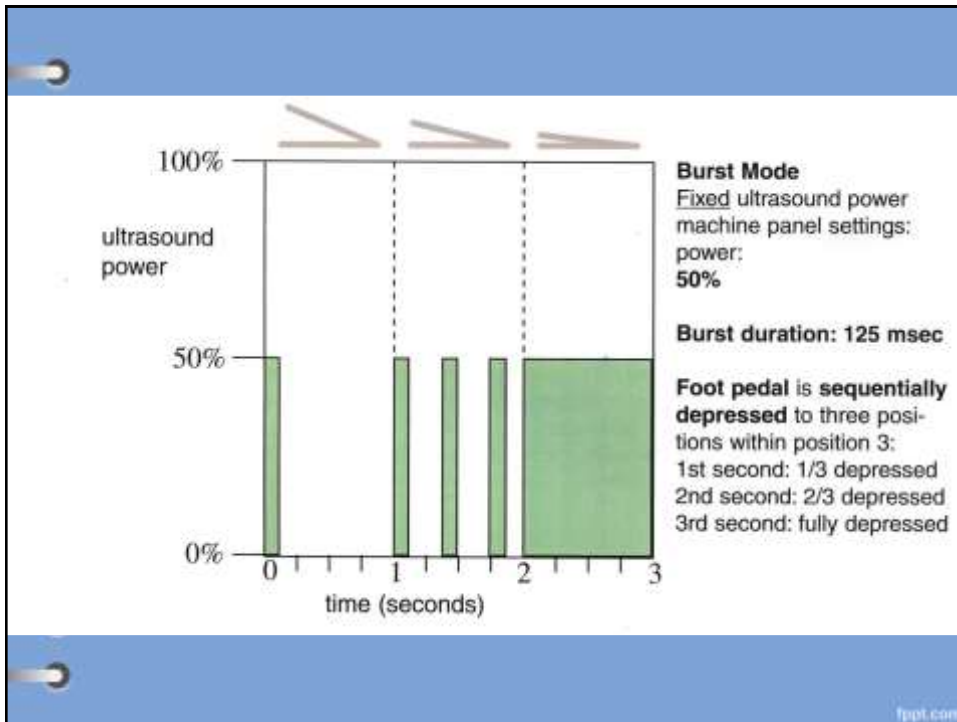
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Burst mode

The **pedal** movement is used to modulate intervals between bursts.

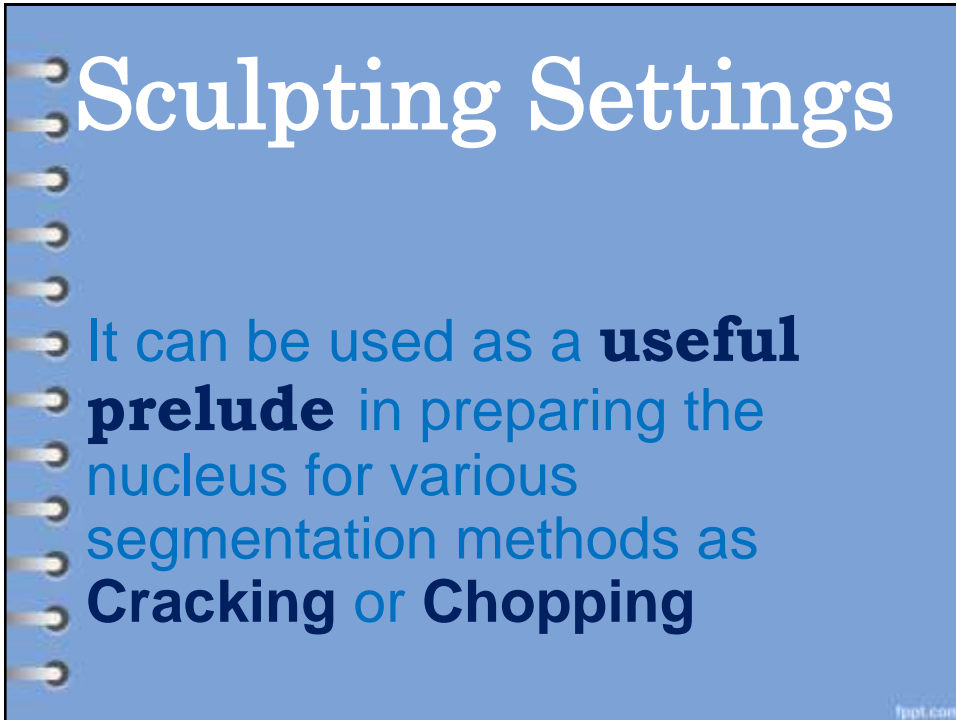
Linear control of number of bursts per second while phaco power remains fixed



HyperPulse Mode

It combine the **Advantages** of both Pulse and Burst modes

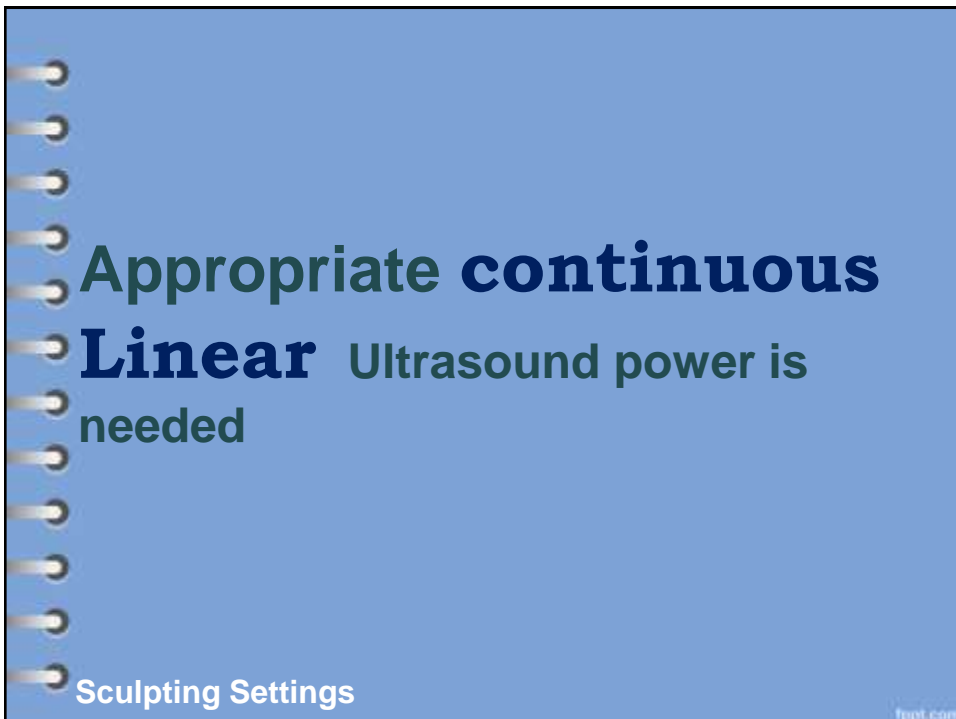
It retains **Linear control** of phaco power plus allows the choice of **Shorter duty cycles** to enable longer off periods

A blue rectangular area with a white spiral binding on the left side, resembling a notebook cover. The text is written in white and dark blue.

Sculpting Settings

It can be used as a **useful prelude** in preparing the nucleus for various segmentation methods as **Cracking or Chopping**

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A blue rectangular area with a white spiral binding on the left side, resembling a notebook cover. The text is written in dark blue and white.

Appropriate continuous Linear Ultrasound power is needed

Sculpting Settings

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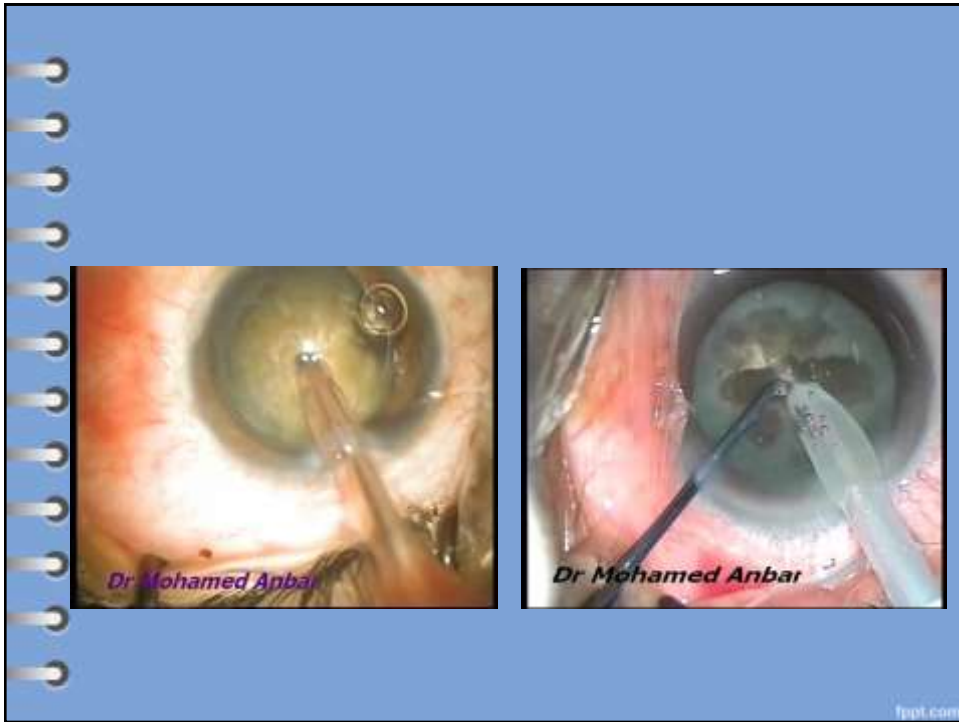
**Don't Use pulse or Burst mode
in sculpting**



High Power	70 %
Low vacuum	70 mmgh
Low flow rate	20 cc/min
Bottle Height	70 cm

Sculpting Settings

foot.com



Quadrant Removal Settings

Low Ultrasound power	Linear Pulse
High vacuum	250-300mmgh
High flow rate	25-35 cc/min
Bottle Height	100 cm



Recommended Readings

The recommended readings section features three book covers. From left to right: 1. 'PHACODYNAMICS: Mastering the Tools and Techniques of Phacoemulsification Surgery' by Barry S. Seiler, with a red and white cover. 2. 'Phaco Chop and Advanced Phaco Techniques' by David F. Chang, with a green cover featuring a grid of eye images. 3. 'ESSENTIALS OF CATARACT SURGERY' by Kenneth A. Robinson, with a blue cover featuring eye images. The background is a blue spiral-bound notebook cover.

