Knobology

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The safety and efficacy of ultrasound (US)-guided pain management interventions relies heavily upon a comprehensive understanding of machine "knobology." Despite differences in appearance and layout, the standard instrumentation and functionality remain essentially the same and all US machines share the same basic operative functions that users must appreciate in order to optimize the image.

This lecture will provide an instructive discussion of the essential functions universal to modern ultrasound machines (the general ultrasound apparatus design, the most common probe types available, and the system controls used to manipulate the images obtained) with focus in use for USG guided pain management interventions.

I will discuss

1. **Basics** of performing US such as ergonomics, optimizing probe handling, stabilizing probes selection of probe frequency etc.
2. **Identifying different tissue types and understanding ultrasound terminology** such as Echogenicity, Scanning planes, Ultrasound views, Angle of incidence, Anisotropy, ultrasound wave frequency, image resolution, penetration
3. **US probes:** I will dicuss various parts and types of the probe. Most of ultrasonography can be accomplished using one of four basic types of probes: (1) curvilinear, (2) linear, (3) sector/phased, and (4) intracavity. For pain management interventions usually linear or curvilinear probes are used depending upon depth of tissue.
4. **Image production and system controls:** To produce US images for evaluation, the machine and probes work in concert to transmit, receive, and depict sound waves.
5. **Adjusting the depth of the scan:** The penetration of the US beam on a particular transducer can be altered by manipulating the frequency of the probe and adjusting the depth or penetration button/knob on the US machine.
6. **Various knobs** such as On-Off , Orientation probe – image (markers), Presets, Depth, Focus, Gain, Freeze, Time Gain Compensation, Measurements, Color Doppler, etc.