

초청 강연 V

초음파진단기의 역사와 최신기술동향

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- 메디슨 연구소 이주형 부장

초음파 진단기의 역사와 최신기술 동향

순환기 질환 의공학회 춘계 학술 강연회
2006년 4월 29일
메디슨 이 주형

April 25, 2006

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목차

초음파 진단기의 역사

초음파 진단기의 기본 기술

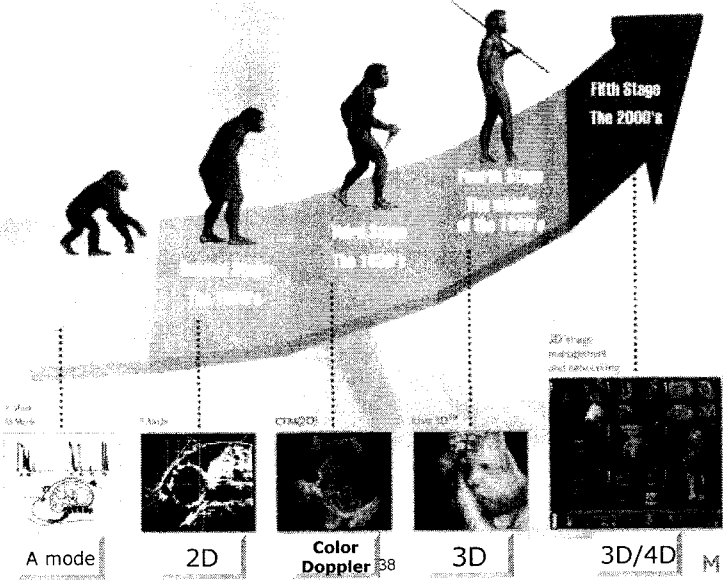
최신 기술 동향

Cardio-vascular application

목차

- 초음파 진단기의 역사
- 초음파 진단기의 기본 기술
- 최신 기술 동향
- Cardio-vascular application

초음파 진단기의 역사



70년대 ~

Static 2D → Real-time 2D

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80년대 ~

Doppler & spectral Doppler

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연도별 주요 milestone들

1970 ~	Static 2D → Real-time 2D
1980 ~	Color Doppler & spectral Doppler
1990 ~	Digital Beamforming
	Full Aperture System
	Harmonic Imaging Technology
2000 ~	3D/4D Ultrasound
	3rd Generation Contrast Agent


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목차

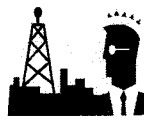
초음파 진단기의 역사
초음파 진단기의 기본 기술
최신 기술 동향
Cardio-vascular application

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Ultrasound



Audible Frequency
20Hz~20,000Hz



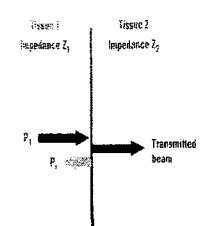
Medical Ultrasound Frequency
1MHz~15MHz

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음파의 성질

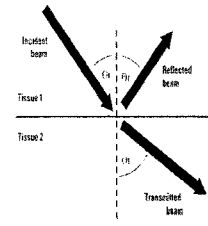
반사

물체에 부딪쳐 돌아오는 현상



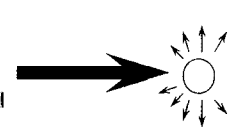
굴절

일직선 상에서 휘어지는 현상



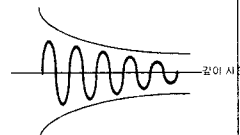
산란

작은 반사체에 부딪친 후 사방으로 퍼지는 현상



감쇠

시간이 지남에 따라 크기가 작아지는 현상



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Source of ultrasound

Piezoelectric effect

Transducer / Scanhead / Probe

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Transducer arrays

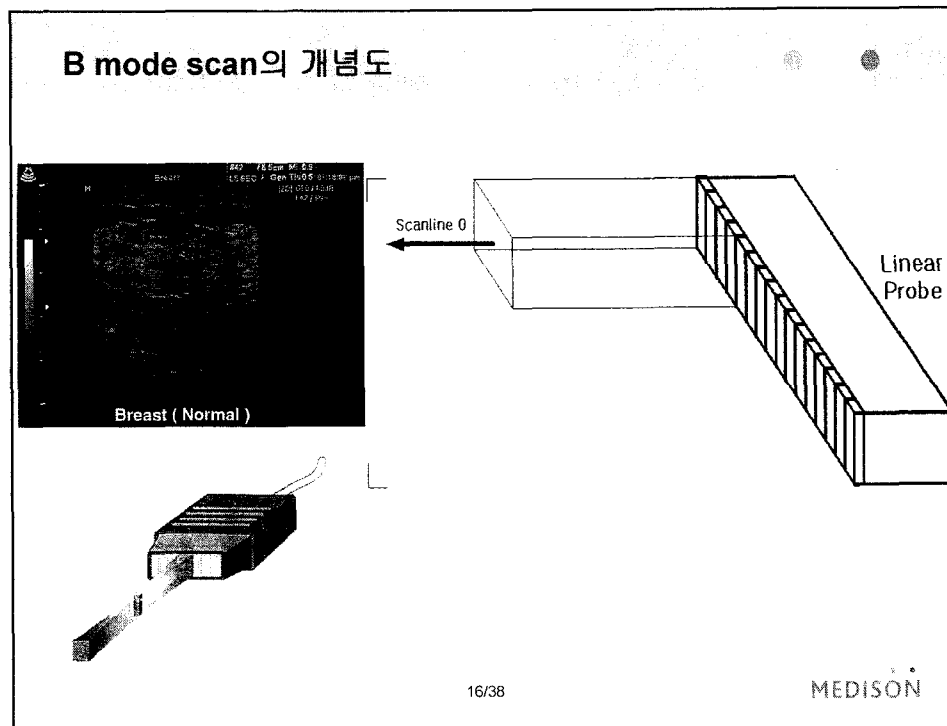
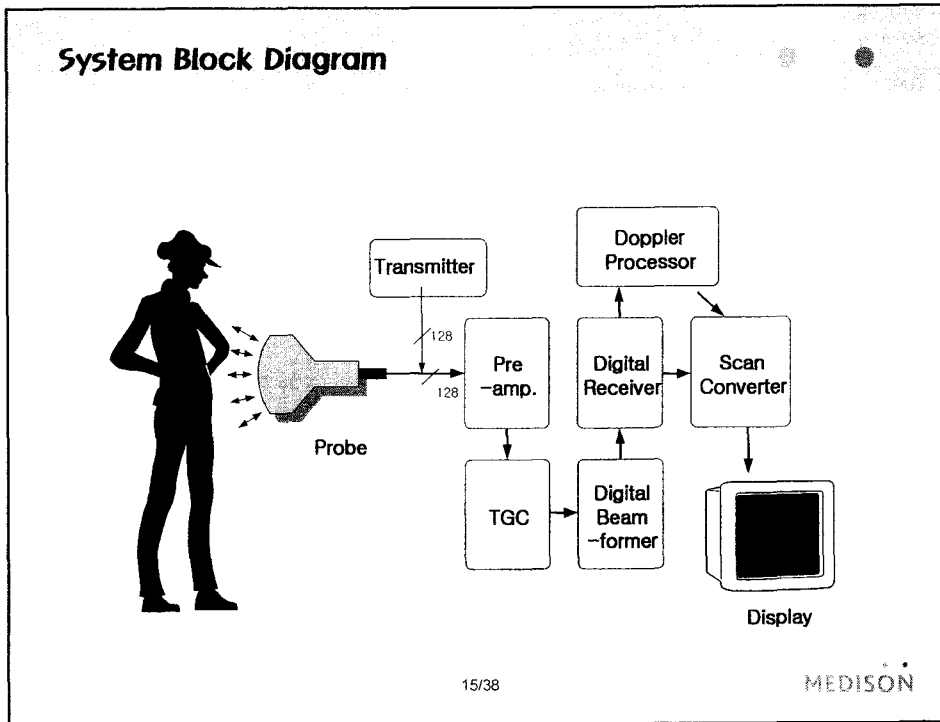
Linear Array Curvilinear Array Phased Array

Advantage of arrays

- Enable beam steering
- Enable electronics focusing and beam forming

14/38

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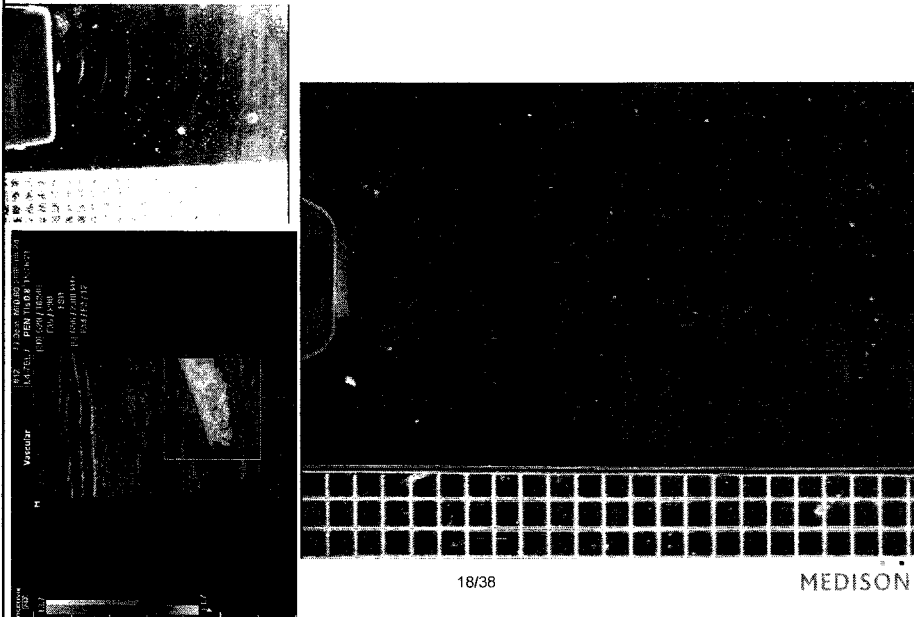
초음파 빔의 형태 (전송, Unfocused transmitting)



17/38

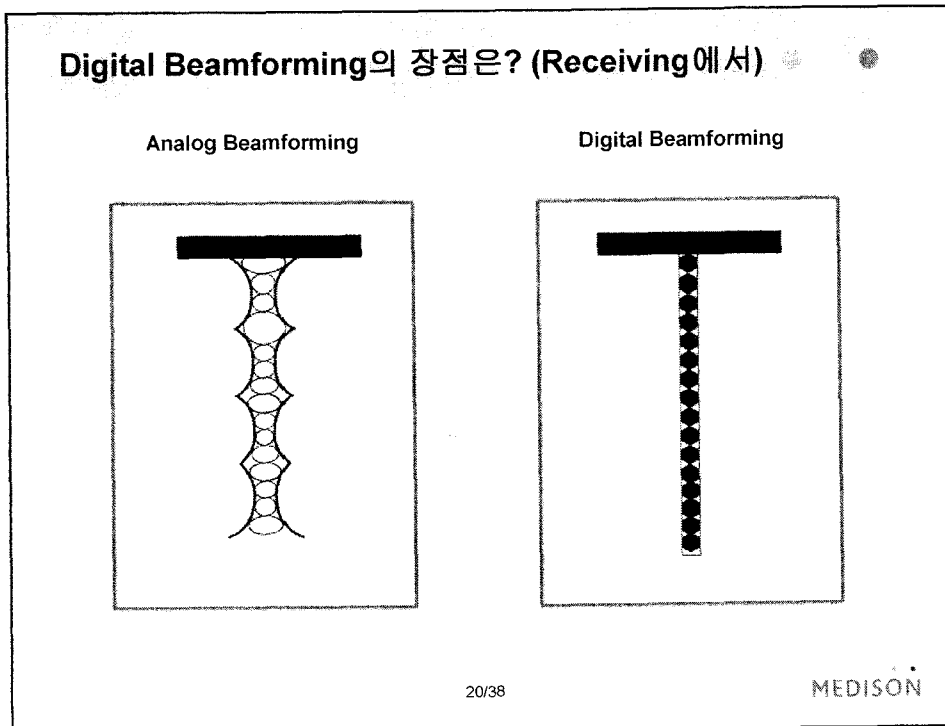
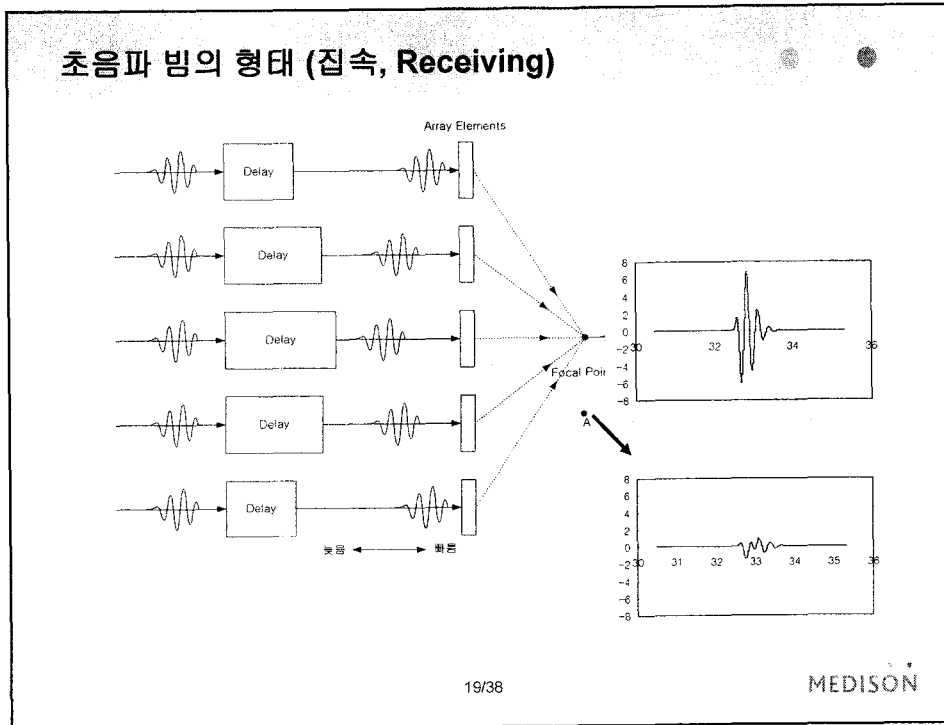
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초음파 빔의 형태 (전송, Focused Transmitting)



18/38

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Digital Beamforming의 장점은?

Analog Beamforming

Digital Beamforming

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목차

- 초음파 진단기의 역사
- 초음파 진단기의 기본 기술
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22/38

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최신 기술 동향

3D/4D ultrasound

Fusion Imaging

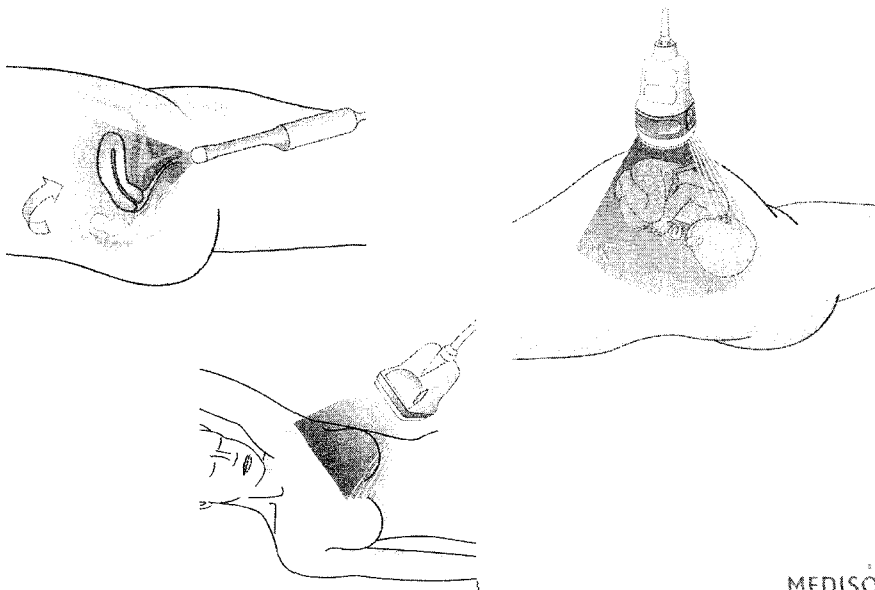
Elastography

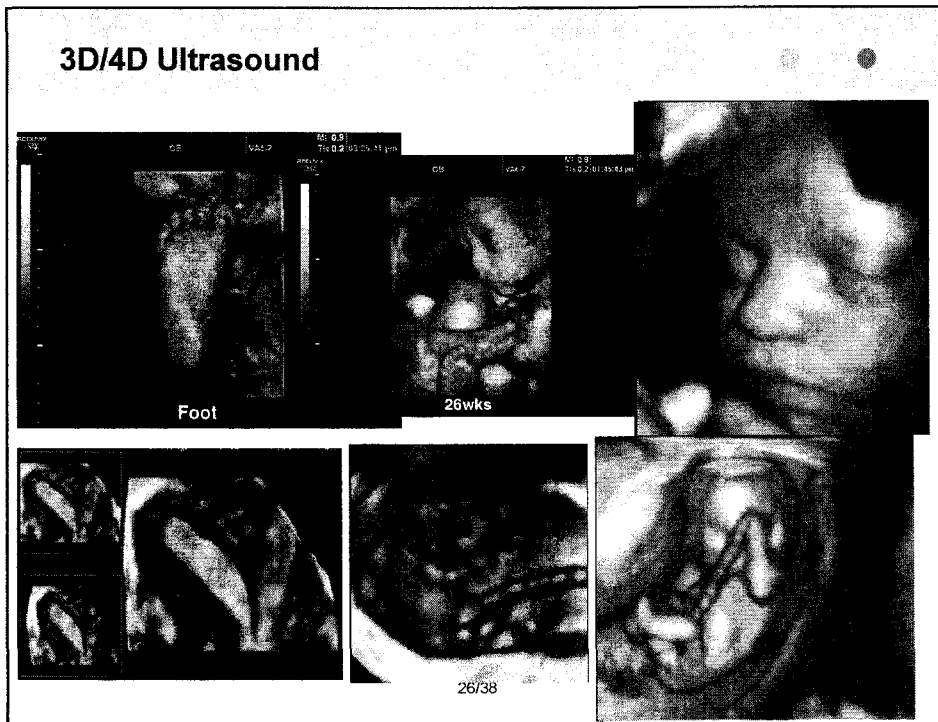
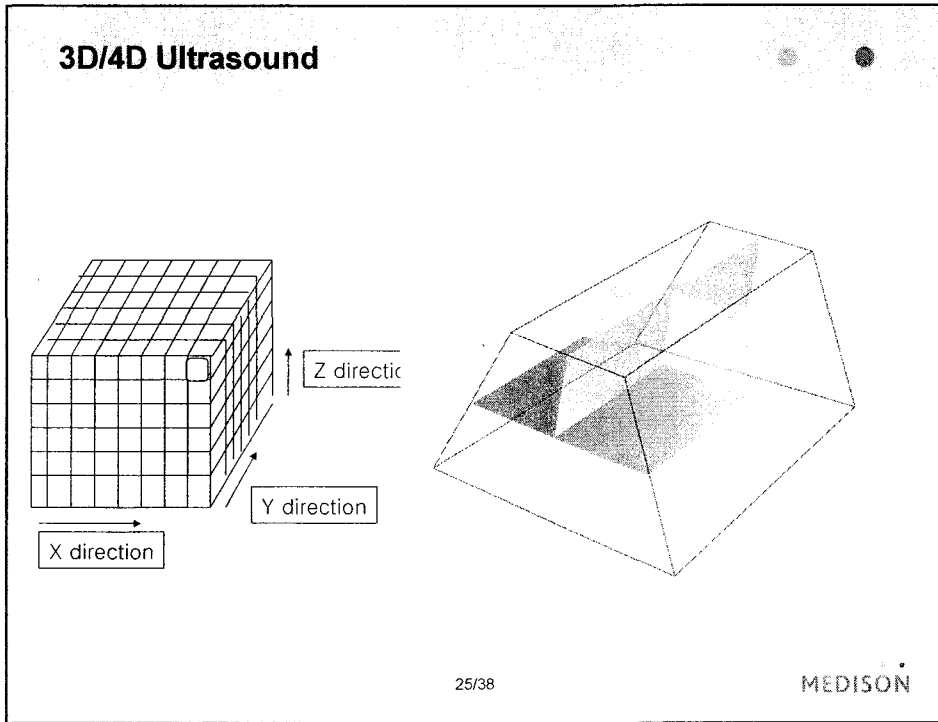
Contrast Agent Imaging

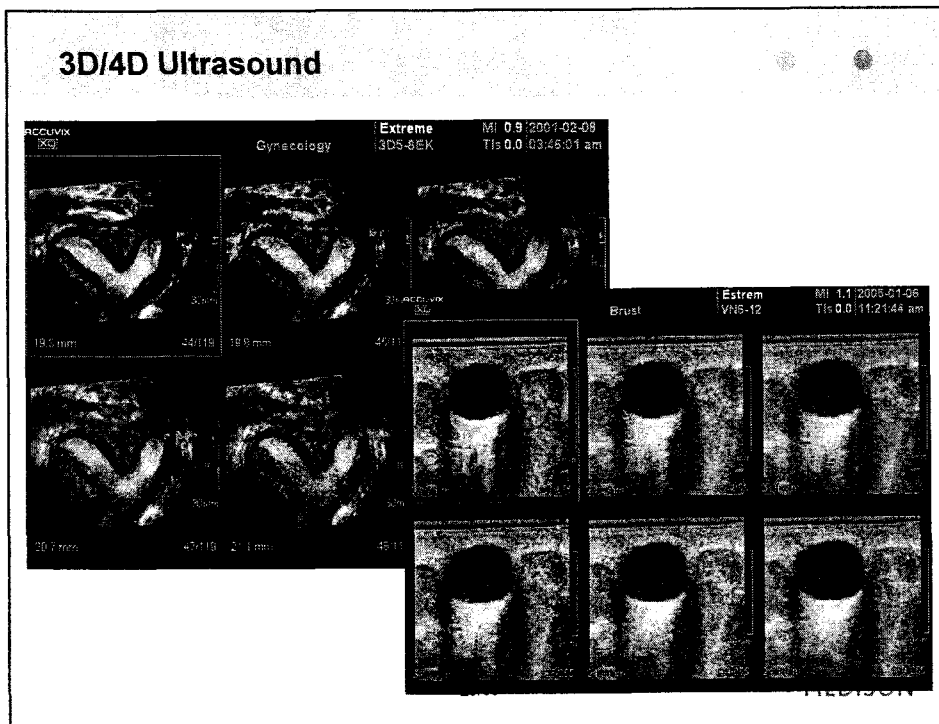
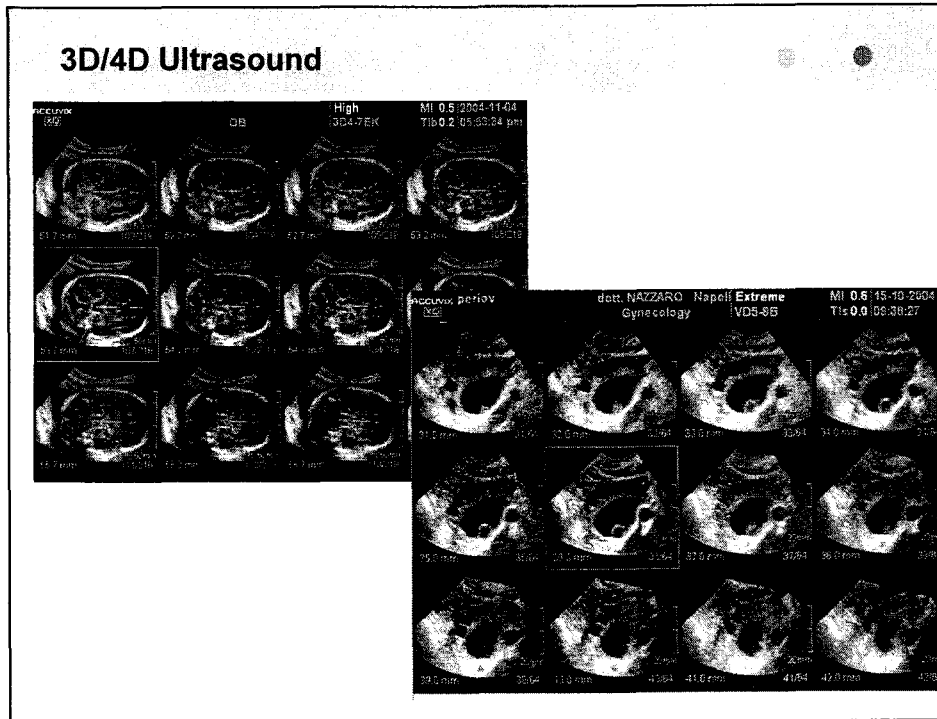
23/38

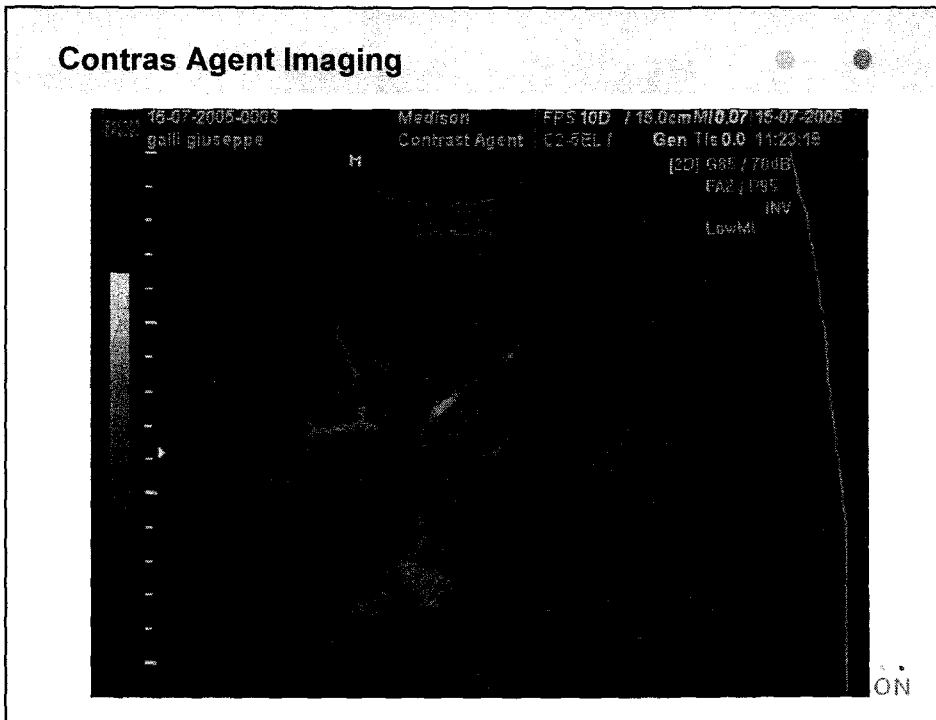
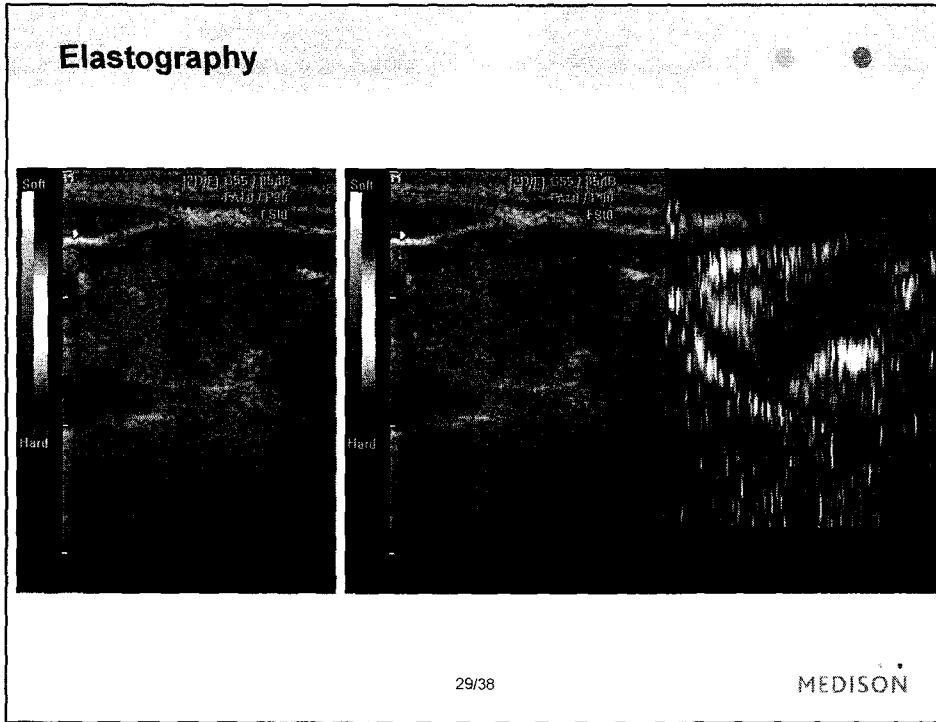
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3D/4D Ultrasound









목차

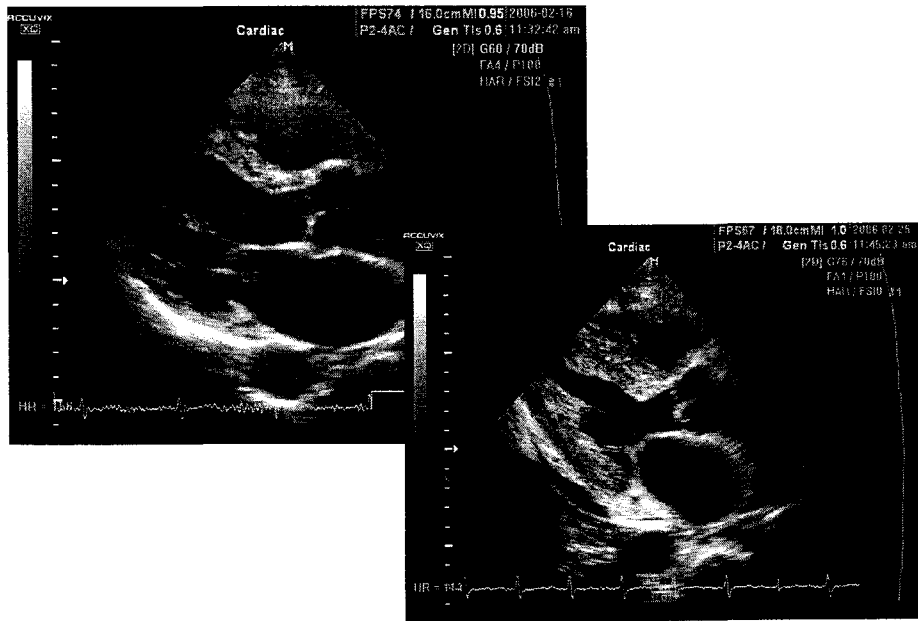
초음파 진단기의 역사

초음파 진단기의 기본 기술

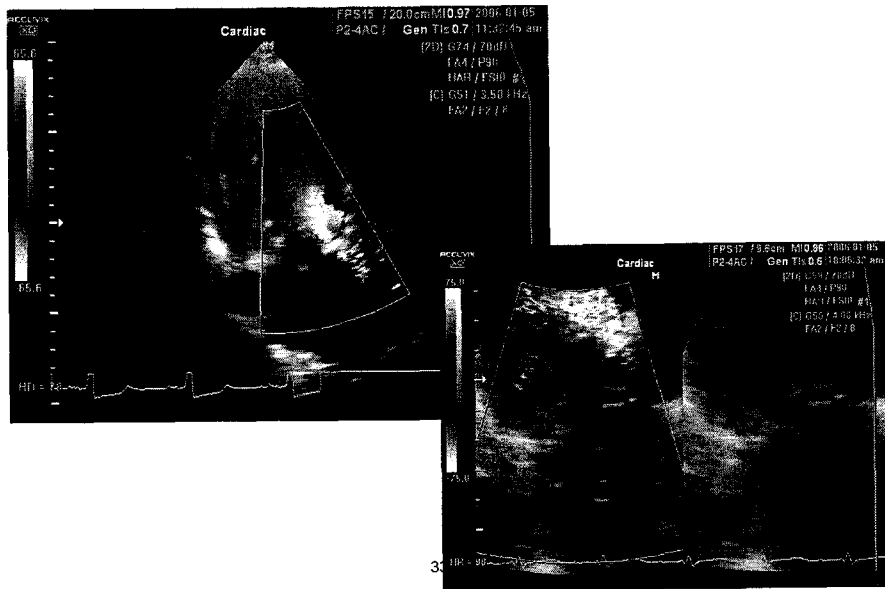
최신 기술 동향

Cardio-vascular application

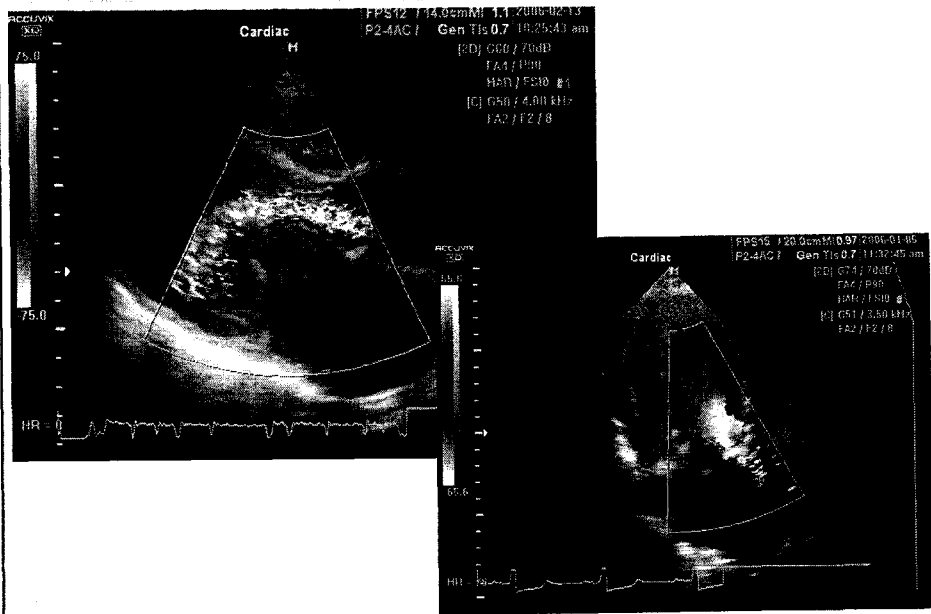
2D image, BW image

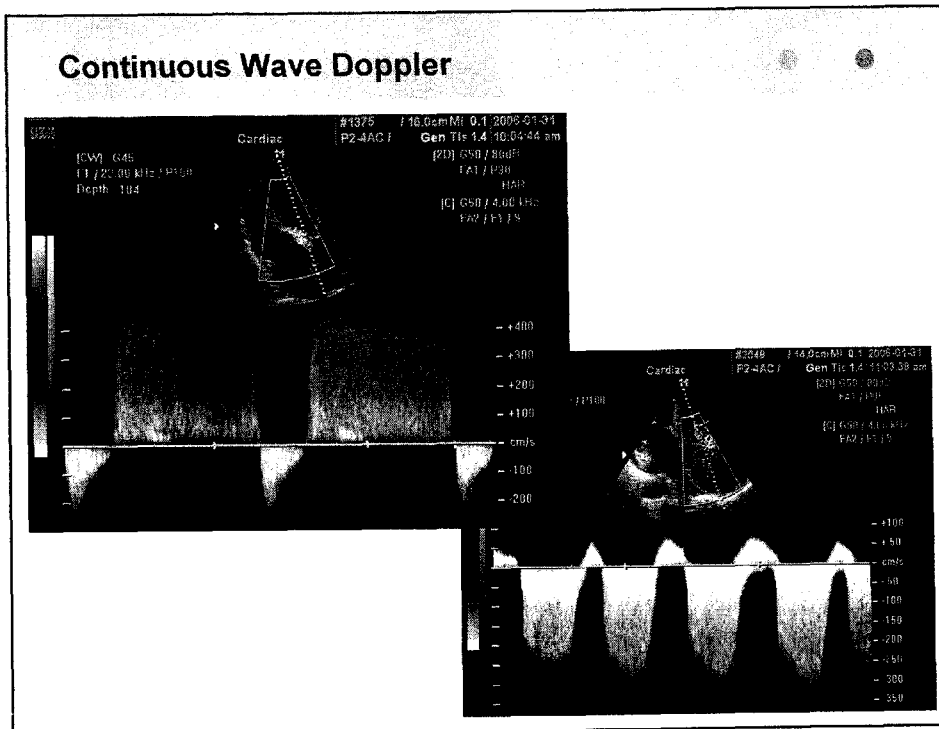
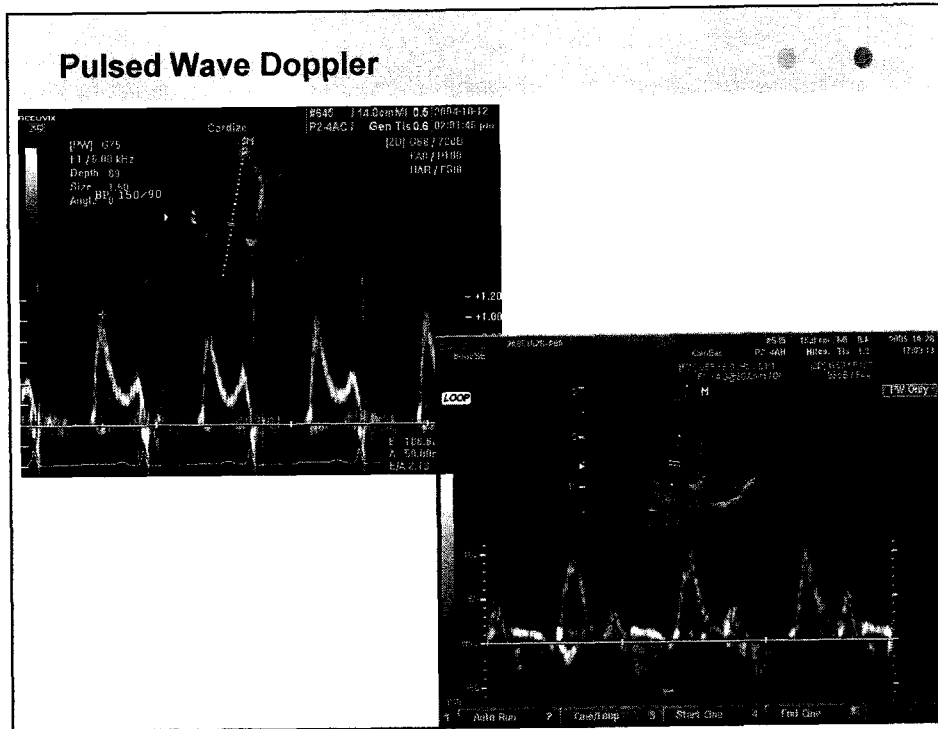


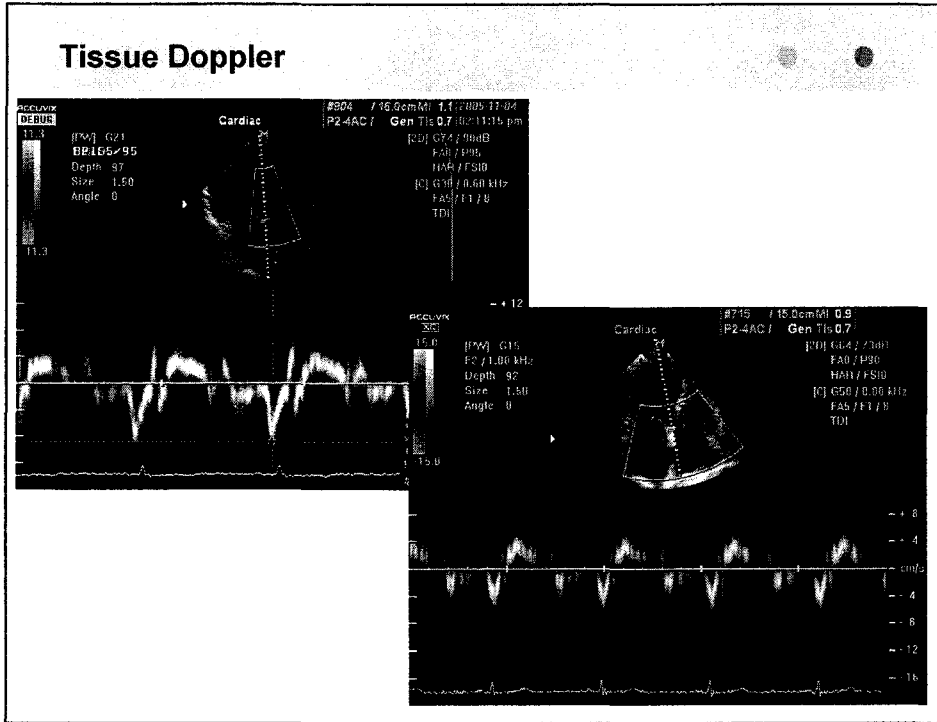
Color Doppler Image – 1



Color Doppler Image – 2







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Marketing Department