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(22) 2001 02 01(71) . .
1 1503 - 3

(72) APT106 804

(74)

:

(54)

(SOS : Speed of Sound), (GI : Geometric Index),
(BUA : Broadband Ultrasound Attenuation)
(UA : Ultrasound Attenuation)
(ROI : Region of Interest)
(SOS)
(GI)
(UA)
(BUA)
(OI : Osteoporosis Index)

가

1 ,
 2 ,
 3 ,
 4 (GI) (ROI) ,
 5 (GI) (ROI) ,
 6 (GI) ,
 7 (BUA) ,
 8 (UA) ,
 9 (SOS) ,
 10 3 ,
 11 .

*

*

1: (Foot Bath) 2: (Water Bath)
 3: (Ultrasonic Transducer)
 4: (Rubber Heater) 5: (x , y)
 6: 7:
 8: 9: (Temperature Sensor)
 10: (Fill Pump) 11: (Drain Pump)
 12: 1 13: 2
 14: (Fill Bottle) 15: (Drain Bottle)
 16: (Control Board) 17:
 18: / (Pulser/Receiver Board)
 19: (Heater Control) 20: (Transformer)
 21:

22: (Stepping Motor Driver)

37: 3

가 , 가 , 가

(ROI) (Auto ROI)

가 .

(OSTEOPOROSIS) 가 가 가

가 1 , 10% , 가

가 , 가

X 가 X (DEXA : Dual Energy X - ray Absorptiometry) 가 .

X 가 (, , , 가) .

가 , 가

가 , 가

가 , 가

(ROI) (Auto ROI)

가 , 3 가 가

(SOS), (GI), (BUA) (UA) (GI) (UA) (SOS) (OI)

(GI) (GI) 가 가

가

(ROI)

30 °C

가

1 95 98 , Borland C++ Builder X - Y

(200)(/ (300)

(200)

(300) 가 / (300) (300) ;

00)

/ 가 /

2

(100)

(100)

1

(3)

2

(x, y)

(1),

가

(2),

(3) 가 (arm) , 2 2
 (5) x y (16)
 (22)가 , (17) (5)
 가 (16) ,
 (16) 1 2 (19), 1 (9),
 2 (12, 13) (10) (11),
 (7), (8), 1 (x y) 2 (
 6) 가 .

3 . 1 (3)
 (2) (115 mm) (arm) ,
 / (18) (3) (2) 2 ,
 (5) (5) (17)
 (16) (22) (6)가
 (x , y) 2 , (16) 가
 (17) .

(14) (10)
 (2) (8) (2)
 (4) 가 (4) (16) (20) 가
 (19) (16) (9) (1) (1)
 (1) (2) (7) (1)
 (16) (16) 1 (12)가
 (1) (15) .
 (16) (11)가 (7) (13)가
 (2) (2) 2 (15) .
 (16) (11)가 (2) (17)
 (17) , (17) .

3 (37)가
 (10)가 (14) (2) 가 (1) 가
 (8) (7) (16) 3 ()
 37) (10) .

(2) (16)가 (4) (19) 가 (9)
 (1) (200) (19) (4)
 (1)

(arm) (22) (5) x y
 (arm) (3) / (18)

가

(Stability Test)가 (ROI:)(26)
 (ROI: Region of Interest) (26) , 3

(1) (2) (16) 2 (13)가 (11)가
 (8) (7) (15) (16)가 1 (12) 2
 (12) (10)
 (ROI) (GI) (UA)
 (Auto ROI)

(SOS) 가 (nBUA: normalized
 BUA), (nUA: normalized UA) 가 , (GI)
 3 가 가

4 (GI) (24) (GI) (24)
 (GI) 가 가 (23)
 (26) (ROI) (25)

5 (GI) (28) (UA) (27)
 (ROI) (26) (GI)
 (UA) (S1), (GI)
 (S2). (ROI) (S1). (UA)

6 (GI) (ROI) . 30
 (GI) (ROI) , (3)가
 . 31

, 32 , 33
 . 6 34 31, 32, 33 (GI)
 , 35 32 가 31 가
 (GI) . 5 ,
 , (GI) , (34) . , (31)
 가 (32)가 (GI) 35
 (Edge Detection) .

(OI: Osteoporosis Index) , (BUA) (SOS)

$$A = A_0 e^{-\alpha x}$$

, A_0 , A x . α ,

$$\alpha = \frac{\ln A_0 - \ln A}{x}$$

(FFT: Fast Fourier Transform)

, 7 (BUA)
 . dB 0.3 (BU
 0.7MHz 가
 A)

8 (UA) dB 0.5MHz
 . (UA)

9 (SOS) (d)
 ($\Delta t = t_1 - t_2$)
 (SOS)

$$t_1 = \frac{d_w}{SOS_w}$$

$$t_2 = \left(\frac{d_w - d}{SOS_w} \right) + \frac{d}{SOS}$$

$$\Delta t = t_1 - t_2 = \left(\frac{d_w - d_w + d}{SOS_w} \right) - \frac{d}{SOS}$$

$$SOS = \frac{SOS_w}{\left[1 - \left(\frac{SOS_w \times \Delta t}{d} \right) \right]} \quad (m/s)$$

, SOS (s), t_2 (m), d (m/s), SOS_w (s), Δt (m/s), t_1 (s), d_w

. , (d) (4) .

$$d = d_w - d_1 - d_2 = d_w - c_w (t_1 + t_2)$$

, d , d_1 d_2 , t_1 t_2 , c_w . c_w ,

(SOS) 1 (OI) (BUA)

$$1 \quad (OI) = \alpha BUA + \beta (SOS - \gamma)$$

, α β BUA SOS 가 , γ BUA SOS BUA가 , , 가 , 가 (OI) , 가 (OI)가 가 , 가 .

10 3 / (25) , (G) I)(24) (25) 3 , (25) 3 (25) . , (25) 3 (25) . 10 36

(GI)

3

10 (GI), 3 (S10), (/ 가), (S20).
3 (S30).

11 가

A/D (S100), (UA) 8Ms(mega sampling)
(peak) 가 (BUA)
ier Transform) (S200). (FFT: Fast Four
FFT (Hanning window) FFT 10
(Spline)

6

가

3

가 가

(Edge Detection)

(Pattern)

가 가

(Pattern)

가

(ROI, region of interest)

가

(57)

1.

SOS),

(BUA)

(UA)

(GI),

(GI)

(UA) (ROI) , BUA SOS

2.

1 , 가 1 :

[1]

$$OI = \alpha BUA + \beta (SOS - \gamma)$$

, α β BUA SOS 가 , γ BUA SOS

3.

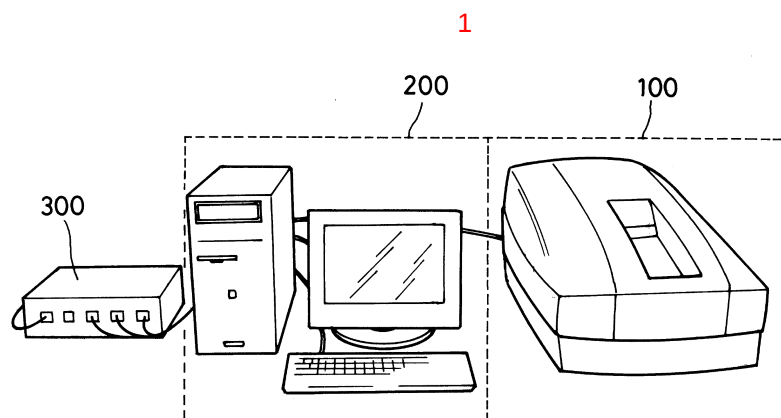
1 , 가 /

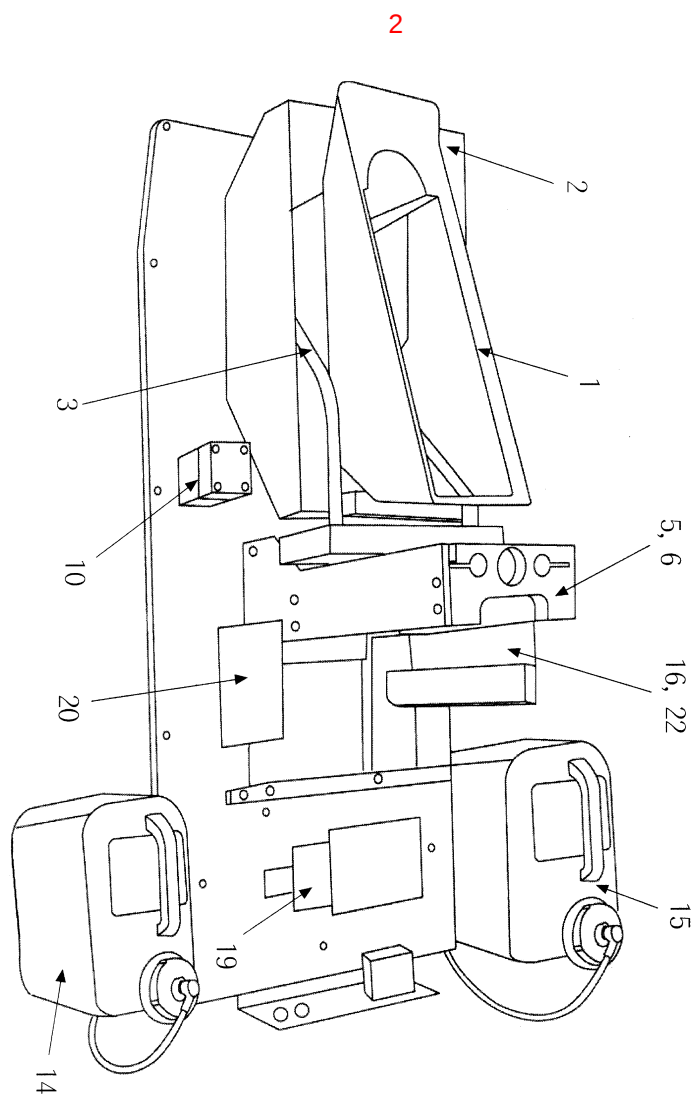
4.

1 , ;
1, 2 3 ;
x y 2 ; , , .

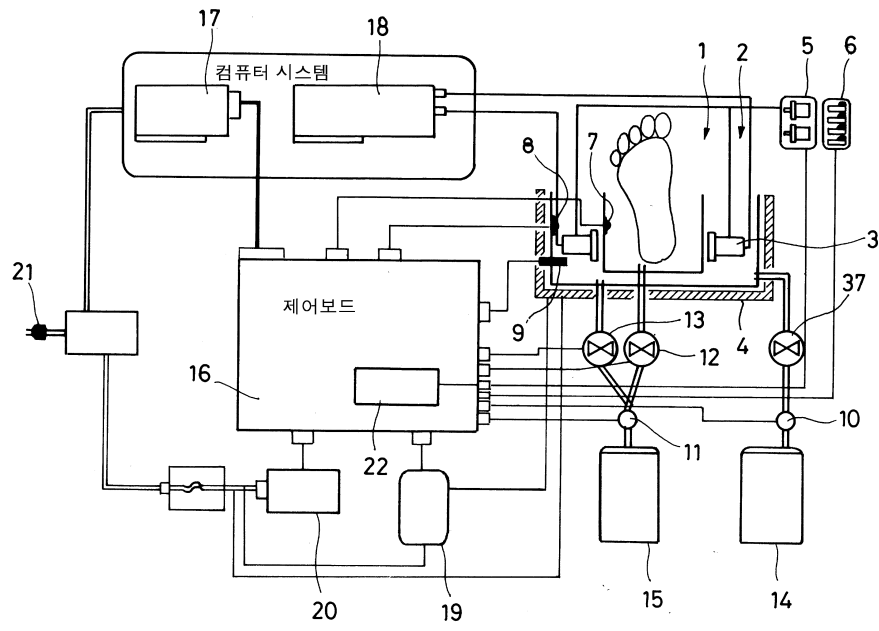
5.

1 , 가 3 , 3

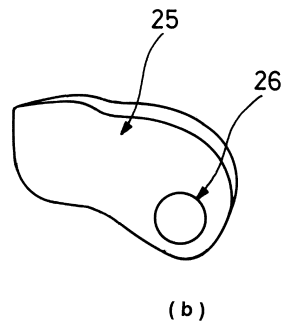
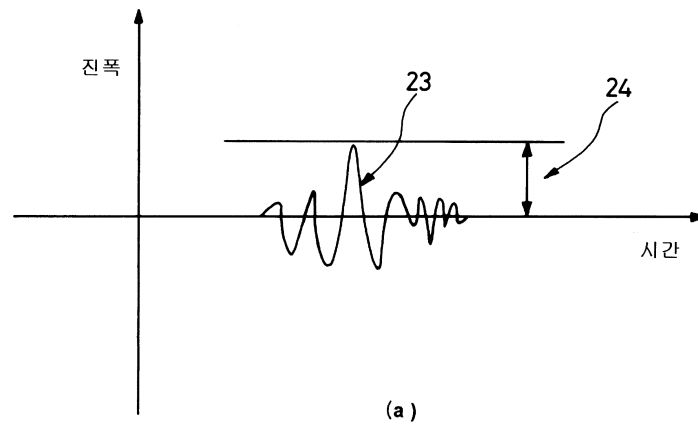




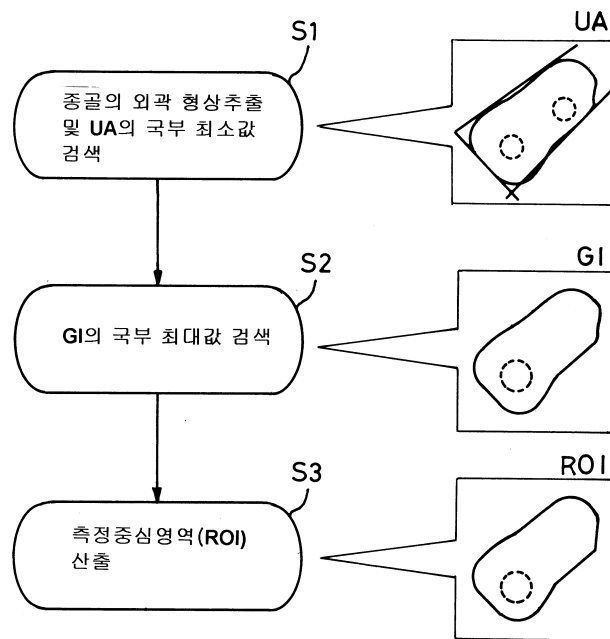
3



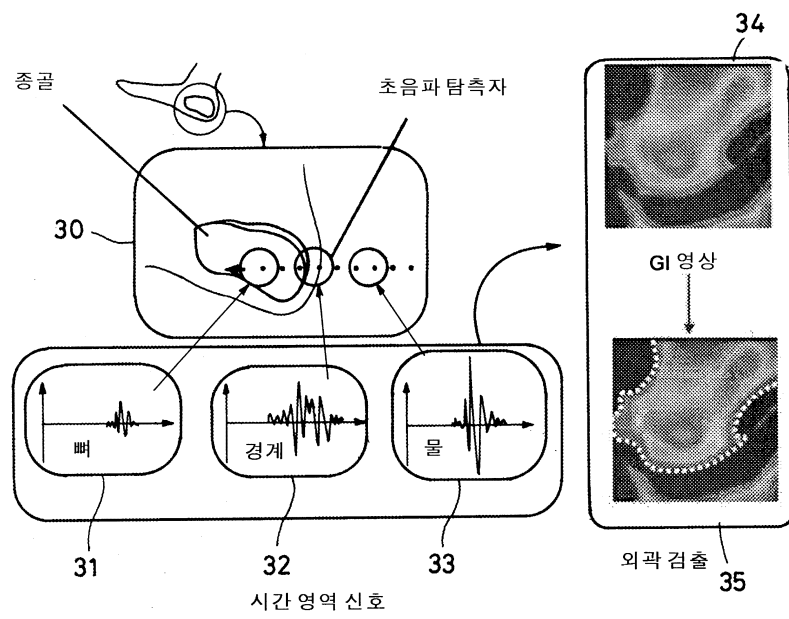
4



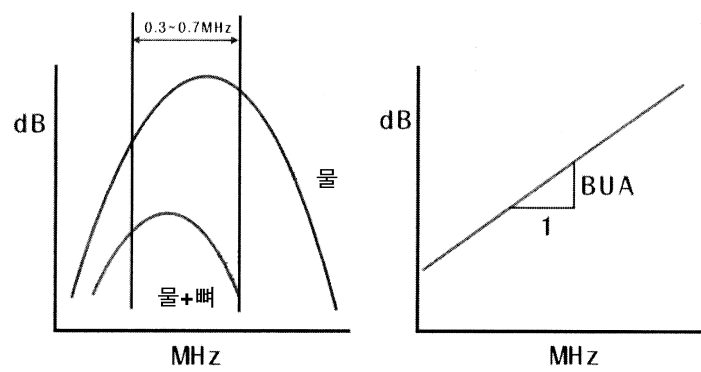
5



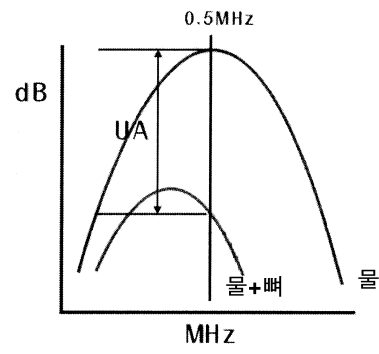
6



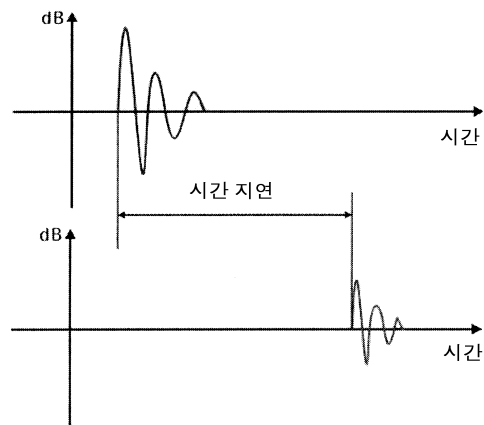
7



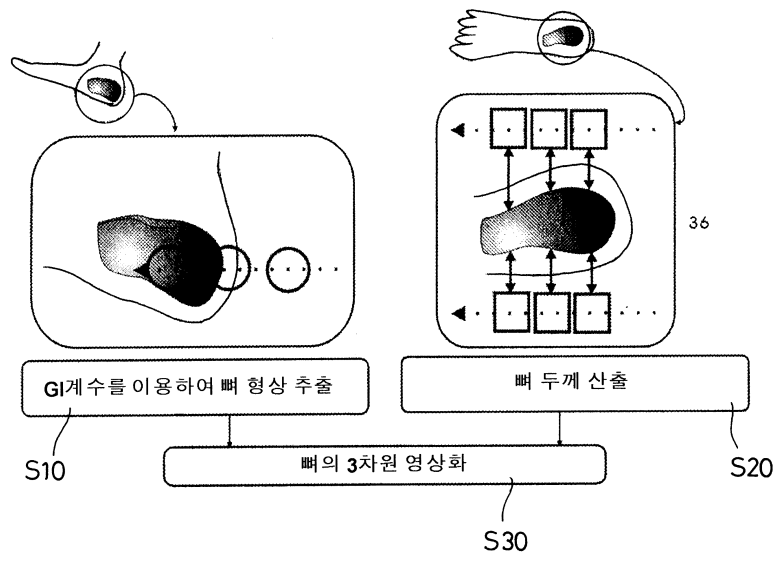
8



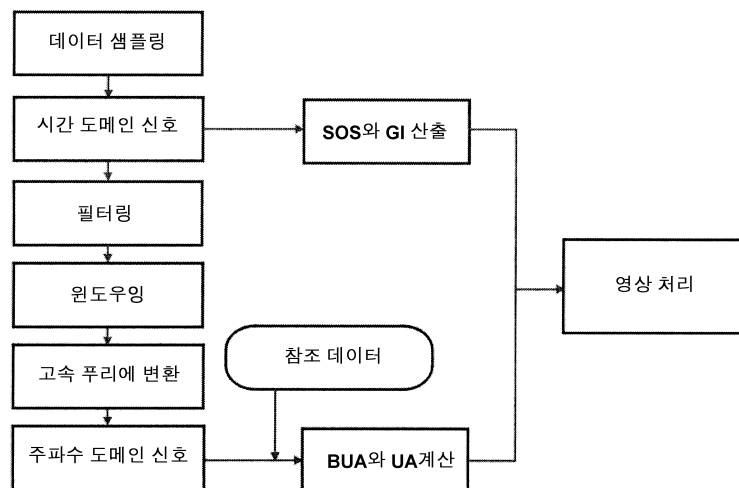
9



10



11



专利名称(译)	超声成像系统		
公开(公告)号	KR1020020064406A	公开(公告)日	2002-08-09
申请号	KR1020010004827	申请日	2001-02-01
[标]申请(专利权)人(译)	B M TECH WORLDWIDE		
申请(专利权)人(译)	非科技有限公司万维网		
当前申请(专利权)人(译)	非科技有限公司万维网		
[标]发明人	HAN SEUNG MOO 한승무		
发明人	한승무		
IPC分类号	A61B8/00		
CPC分类号	A61B8/0875 G01N29/24 G01S15/89		
代理人(译)	金鹤JE MOON, 惠延		
其他公开文献	KR100405000B1		
外部链接	Espacenet		

摘要(译)

本发明是一种超声波骨成像装置，特别是计算机系统，配电，并且由扫描系统，所述计算机系统通过在时域中，超声波速度的扫描系统的分析的超声波探头通过扫描得到的超声波信号（SOS：声速），则形状指数（GI：几何指数），并且计算骨的厚度，并通过分析频域超声宽带衰减（BUA：宽带超声衰减）和超声纯水衰减（UA：超声衰减）的求，形状指数（GI），并使用测量中心区域中的超声波的纯水衰减（UA）：所述（感兴趣的ROI区域）进行提取，并从这些测量中心区域宽带衰减（BUA）和超声波速度的超声波（SOS）骨质疏松症指数由线性组合：涉及一种超声骨显像，其特征在于，用于计算的（OI的骨质疏松症指数）时，本发明的目标公证人诊断使骨质疏松症的诊断，即更精确和可靠的测量误差最小化由于测量位置，并且提供了显著效果，使骨质量的成像。1 指数方面 线性扫描仪，超声波脉冲发生器/接收板，超声波参数，用户软件，骨质疏松指数，形状指数

