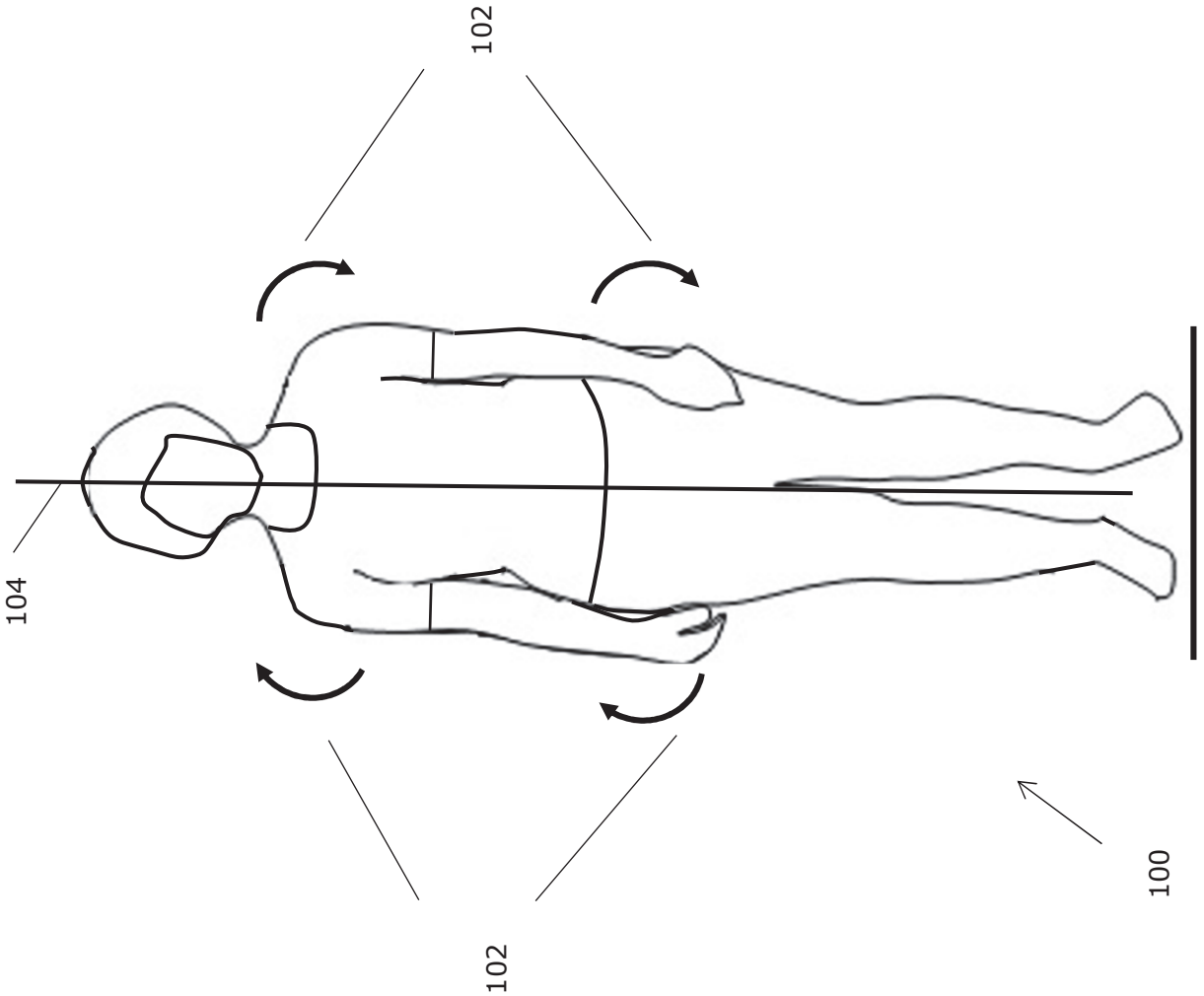


Figure 1

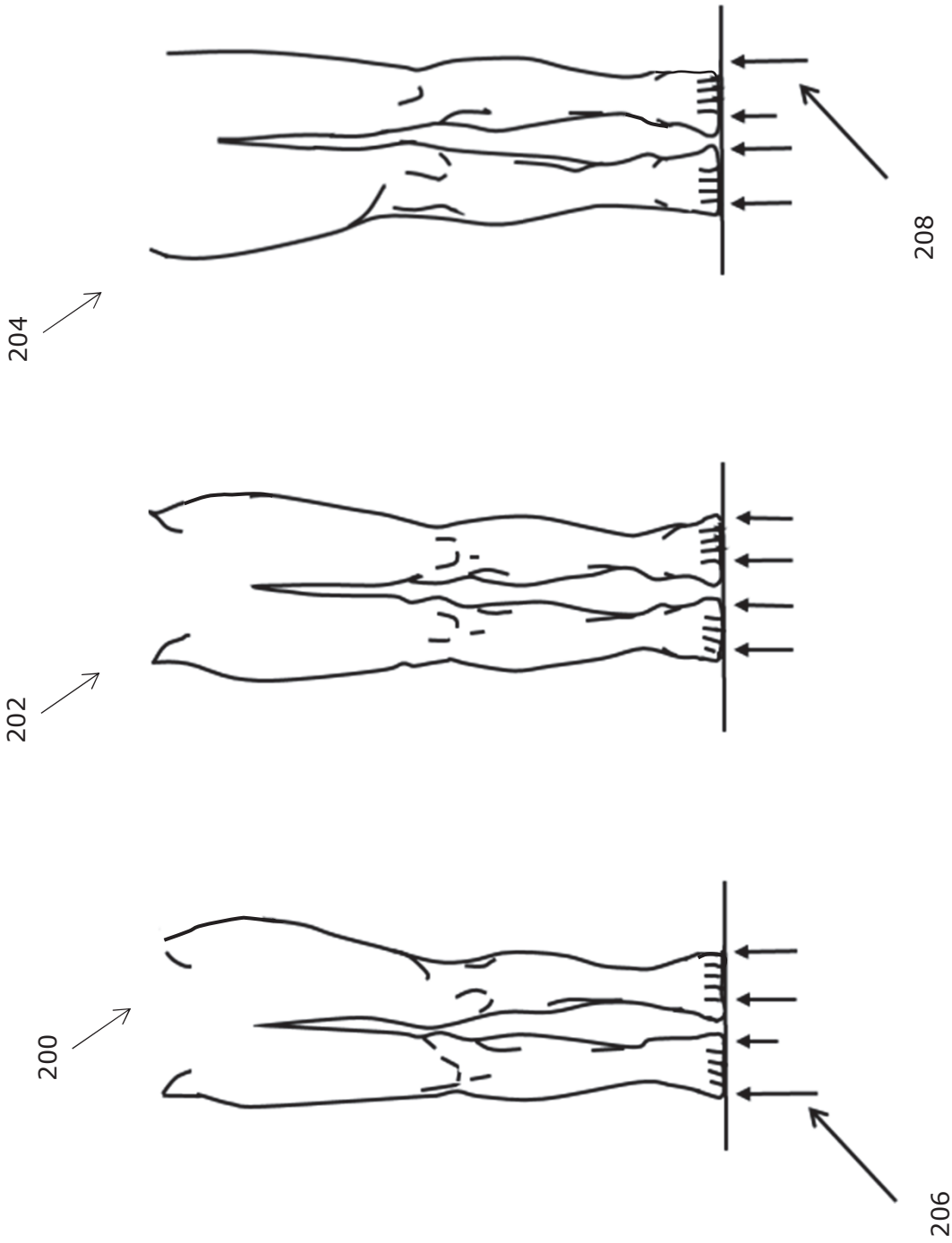


Figure 2

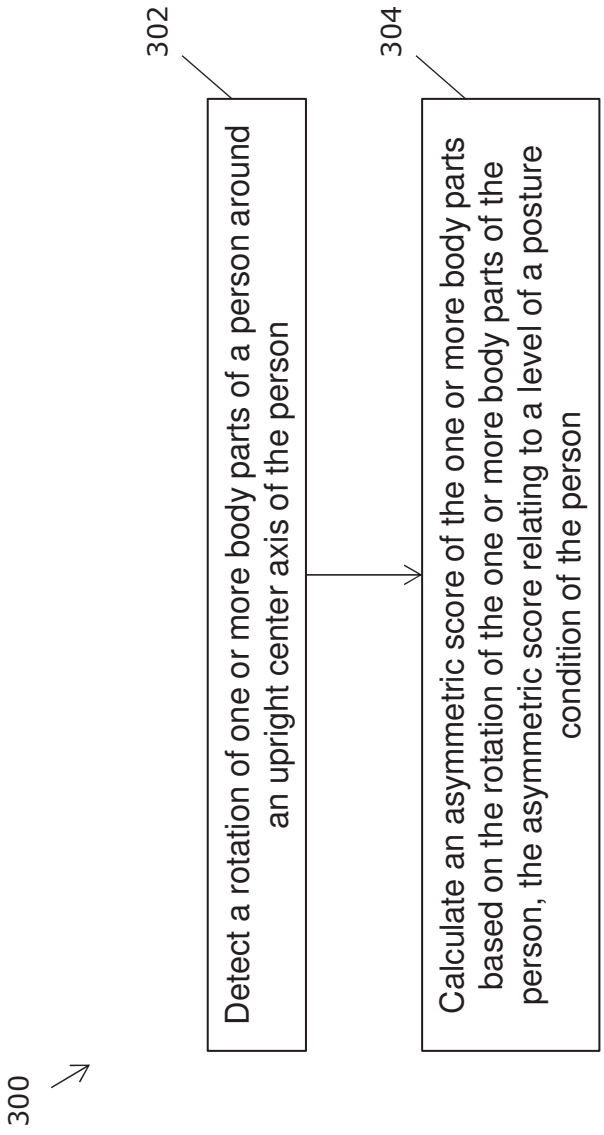

300
302
Detect a rotation of one or more body parts of a person around an upright center axis of the person
304
Calculate an asymmetric score of the one or more body parts based on the rotation of the one or more body parts of the person, the asymmetric score relating to a level of a posture condition of the person

Figure 3

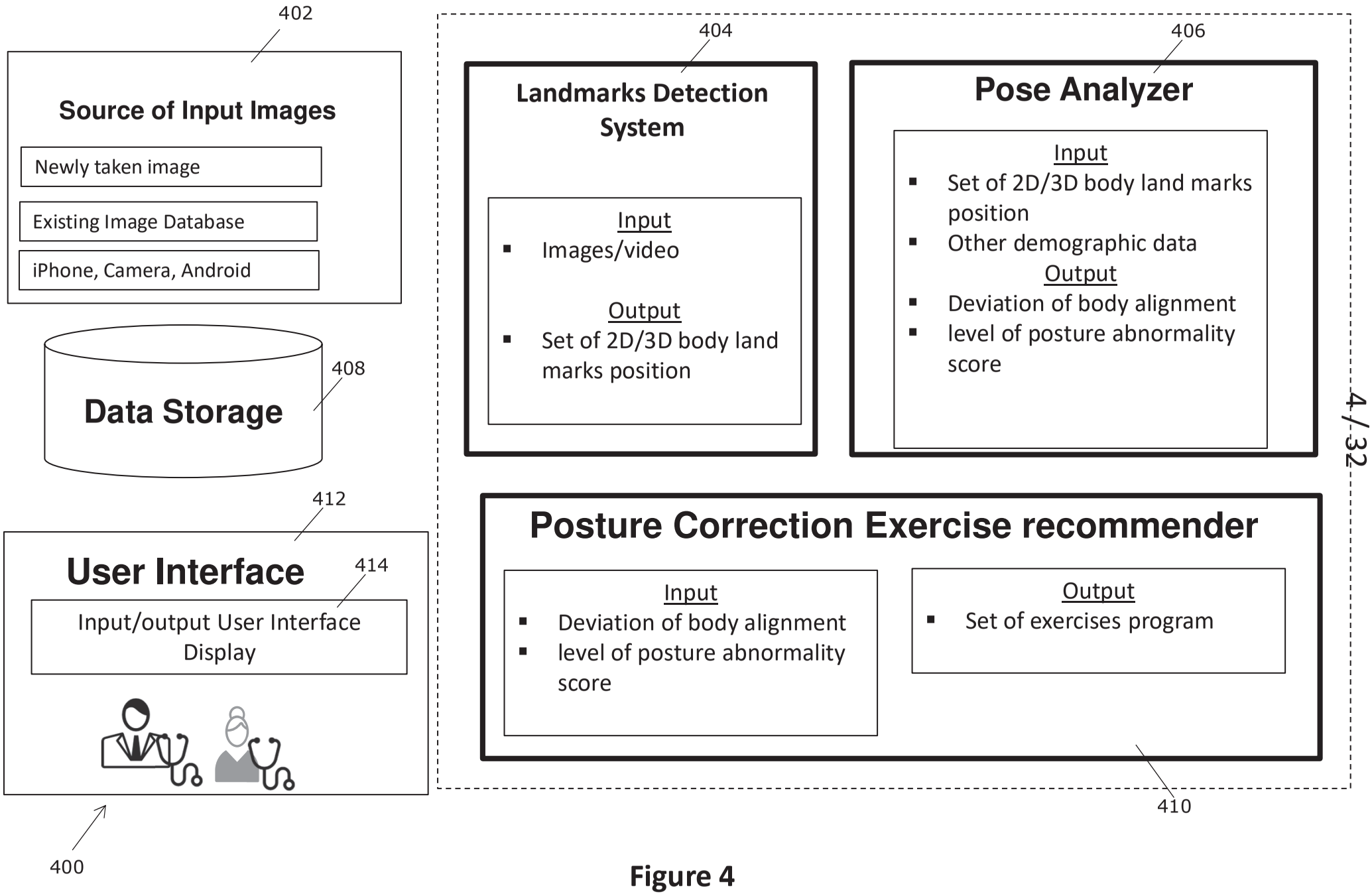

402
Source of Input Images
Newly taken image
Existing Image Database
iPhone, Camera, Android
Data Storage
408
412
User Interface
414
Input/output User Interface Display
400
404
Landmarks Detection System
Input
Images/video
Output
Set of 2D/3D body land marks position
406
Pose Analyzer
Input
Set of 2D/3D body land marks position
Other demographic data
Output
Deviation of body alignment
level of posture abnormality score
Posture Correction Exercise recommender
Input
Deviation of body alignment
level of posture abnormality score
Output
Set of exercises program
410

Figure 4

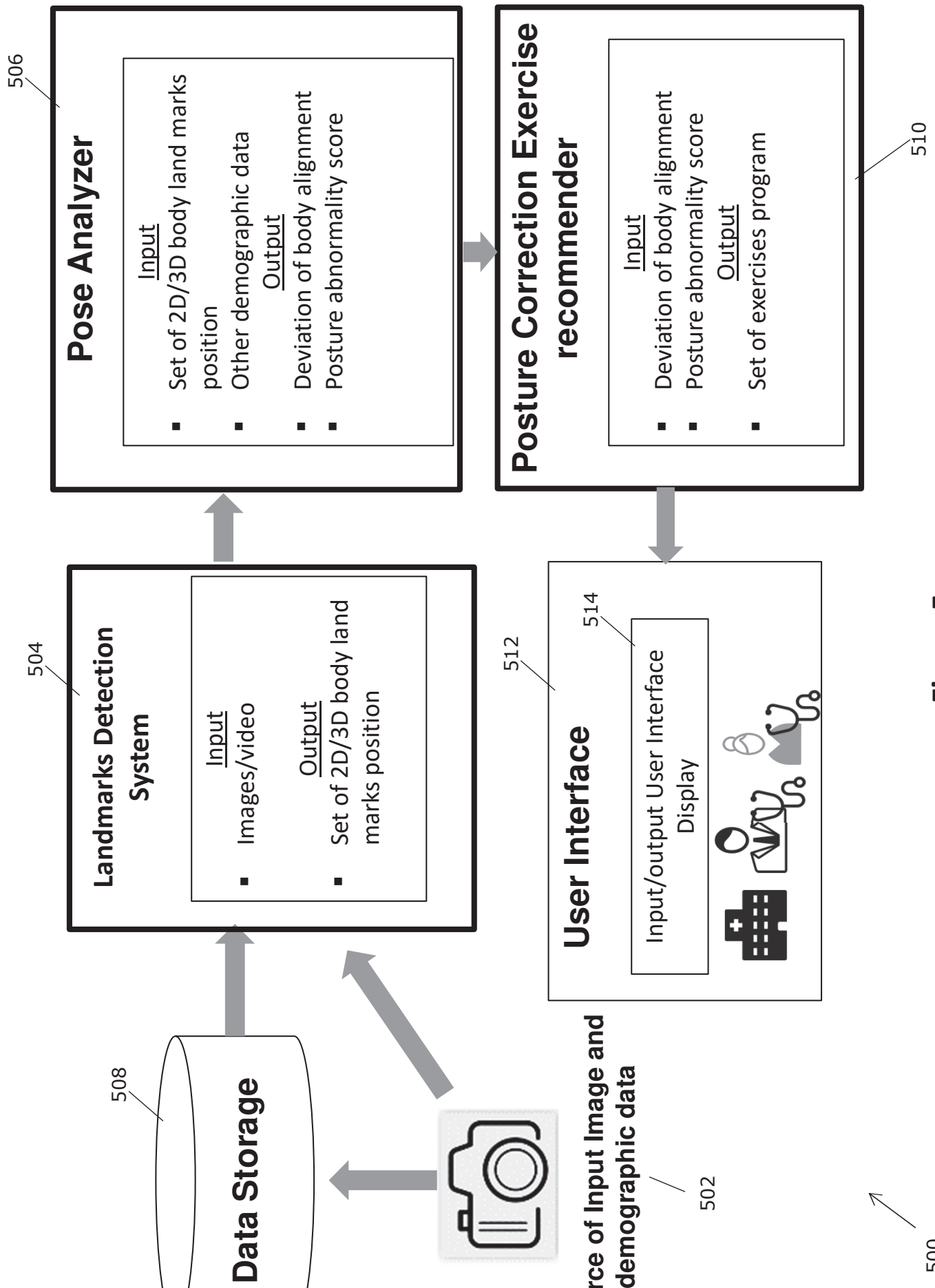

Pose Analyzer
Input
Set of 2D/3D body land marks position
Other demographic data
Output
Deviation of body alignment
Posture abnormality score
506
Posture Correction Exercise recommender
Input
Deviation of body alignment
Posture abnormality score
Output
Set of exercises program
510
Landmarks Detection System
Input
Images/video
Output
Set of 2D/3D body land marks position
504
User Interface
514
Input/output User Interface Display
512
Data Storage
508
Source of Input Image and demographic data
502
500

Figure 5

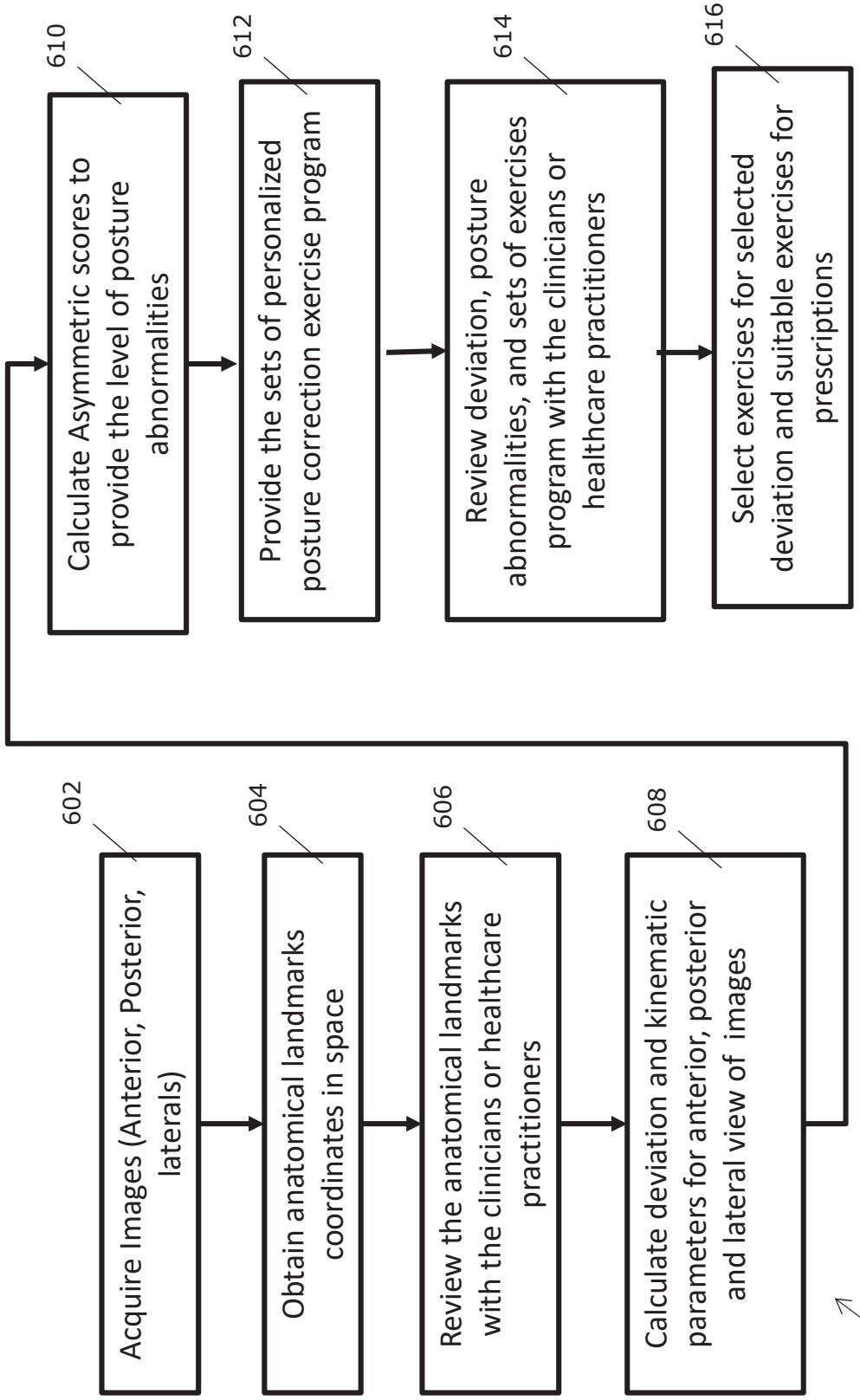

Acquire Images (Anterior, Posterior, laterals)
602
Obtain anatomical landmarks coordinates in space
604
Review the anatomical landmarks with the clinicians or healthcare practitioners
606
Calculate deviation and kinematic parameters for anterior, posterior and lateral view of images
608
Calculate Asymmetric scores to provide the level of posture abnormalities
610
Provide the sets of personalized posture correction exercise program
612
Review deviation, posture abnormalities, and sets of exercises program with the clinicians or healthcare practitioners
614
Select exercises for selected deviation and suitable exercises for prescriptions
616
600

Figure 6

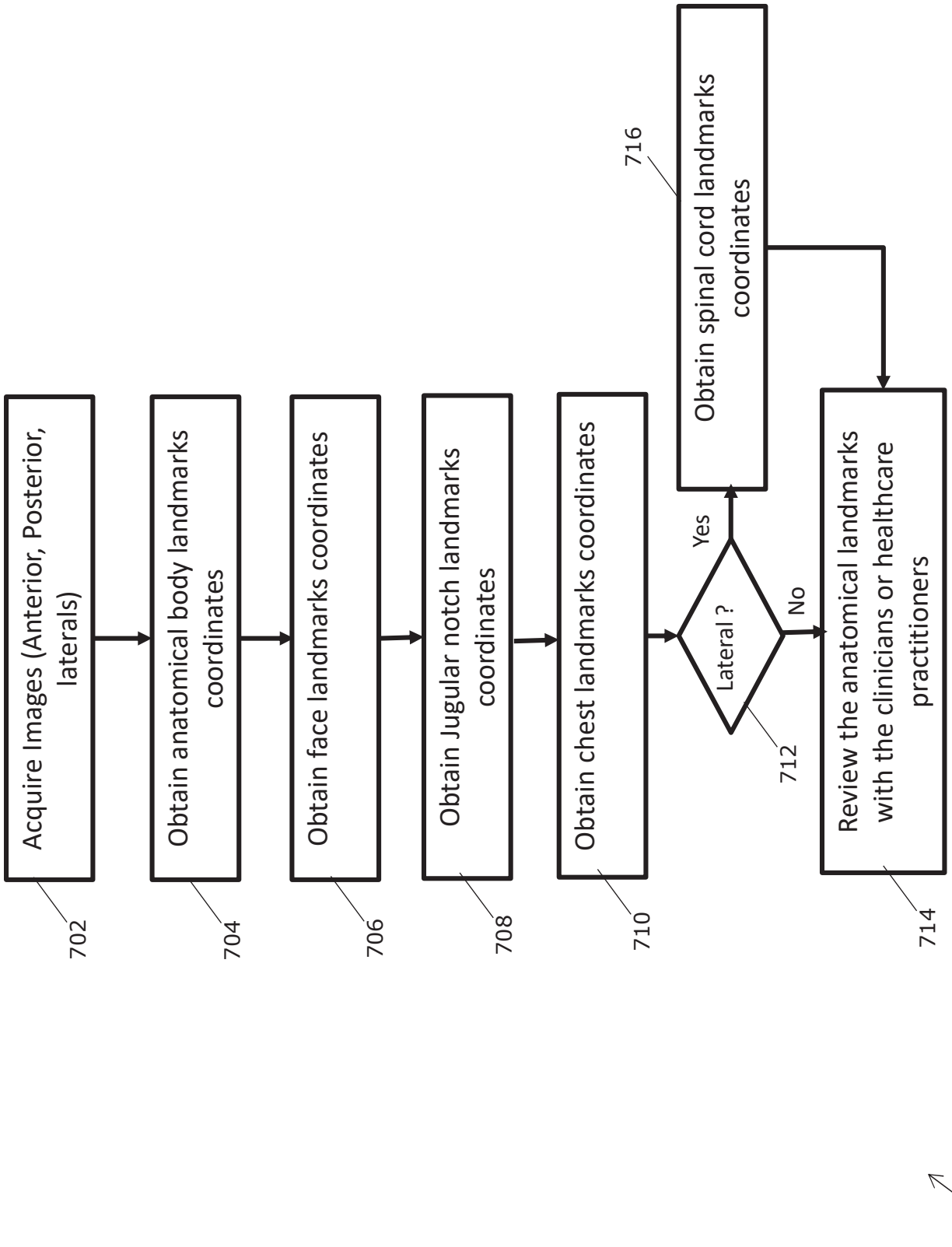

Acquire Images (Anterior, Posterior, laterals)
Obtain anatomical body landmarks coordinates
Obtain face landmarks coordinates
Obtain Jugular notch landmarks coordinates
Obtain chest landmarks coordinates
Lateral ?
Yes
No
Obtain spinal cord landmarks coordinates
Review the anatomical landmarks with the clinicians or healthcare practitioners
702
704
706
708
710
712
714
716
700

Figure 7

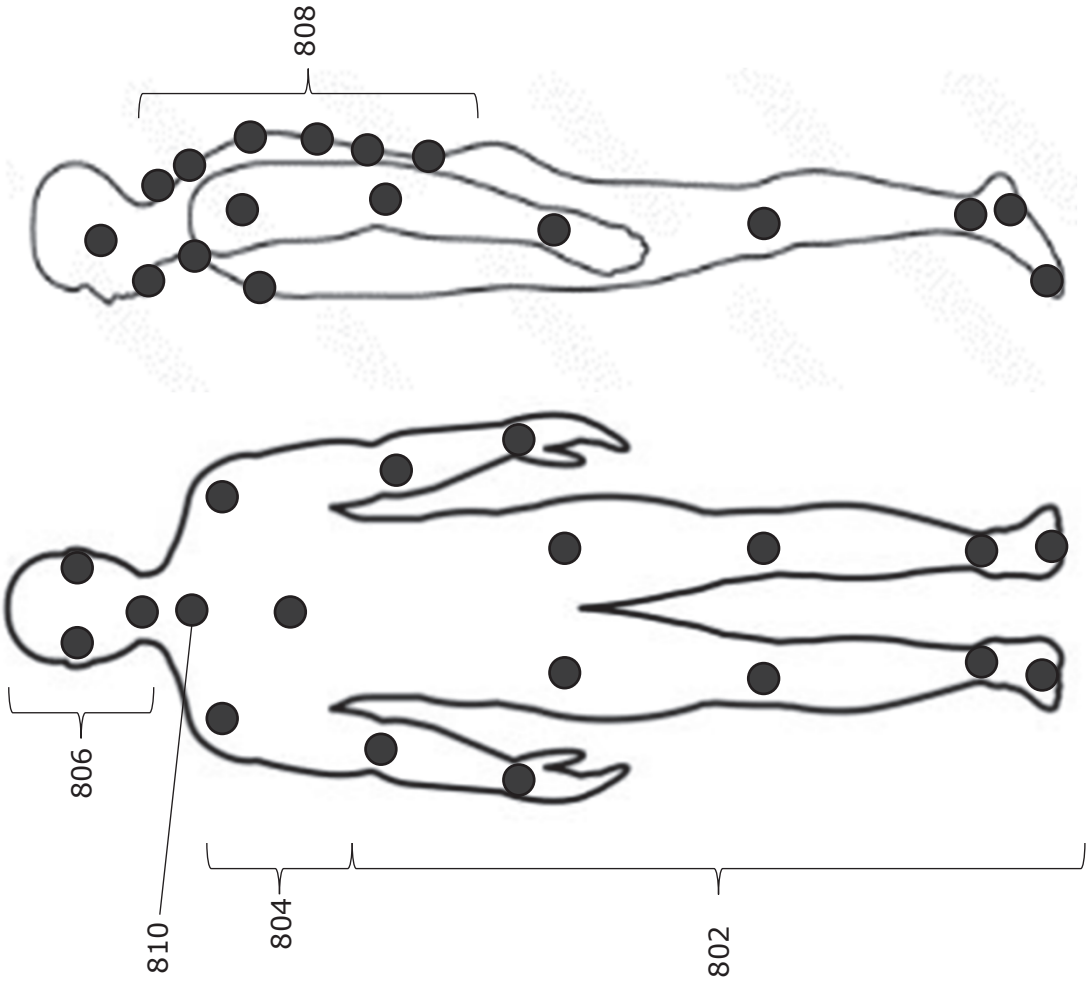


Figure 8

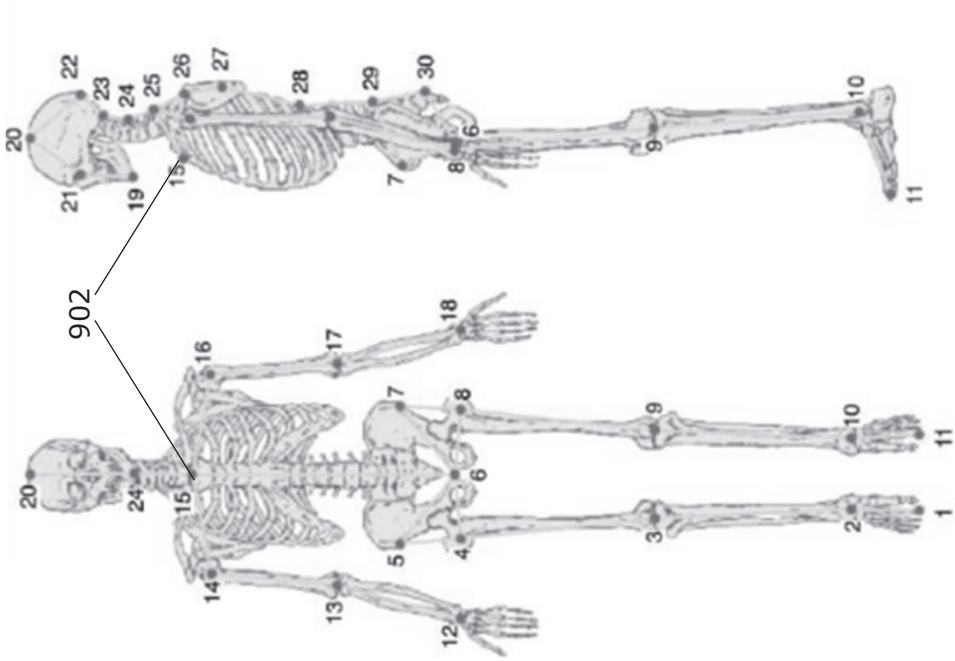
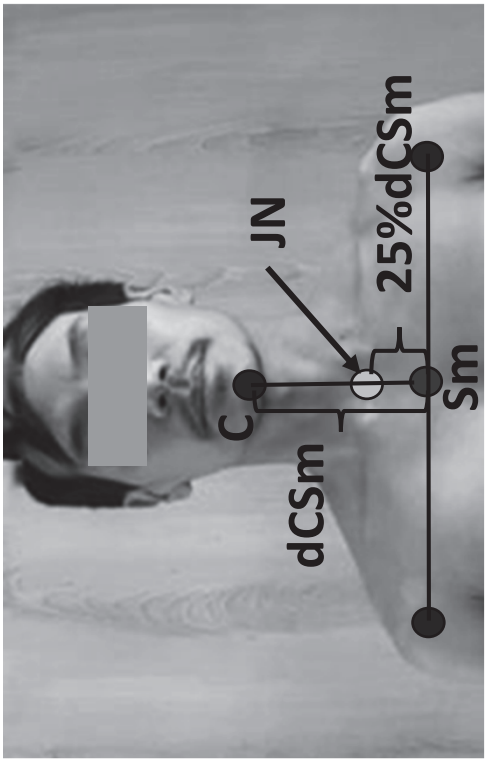
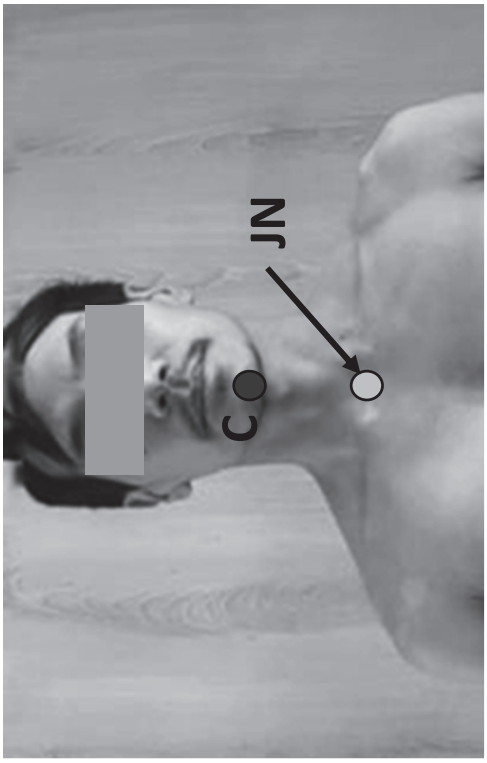


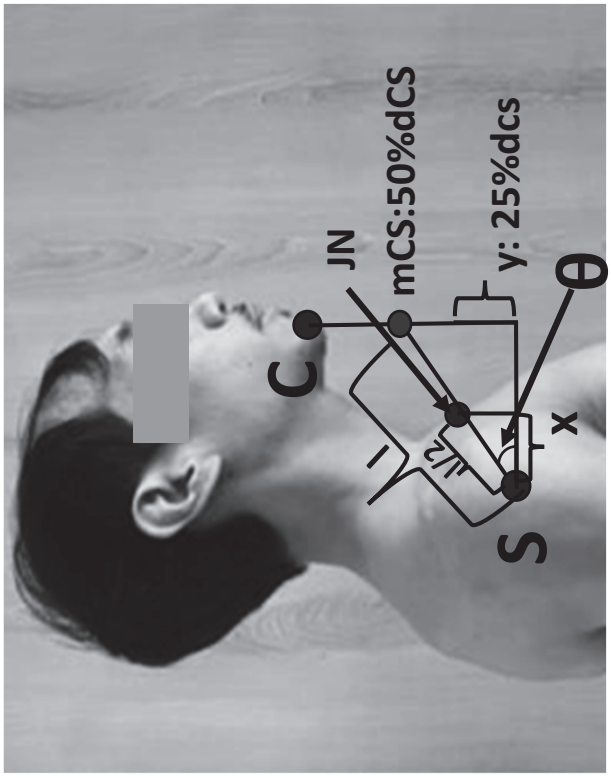
Figure 9





1000

Figure 10



1100

Figure 11

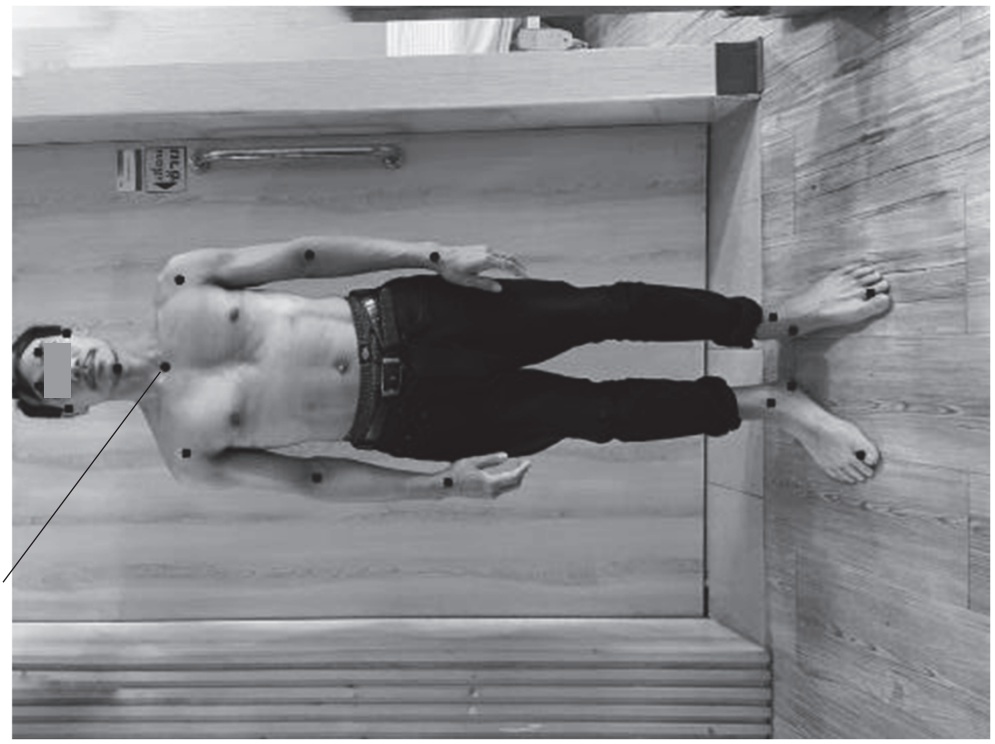


Figure 12

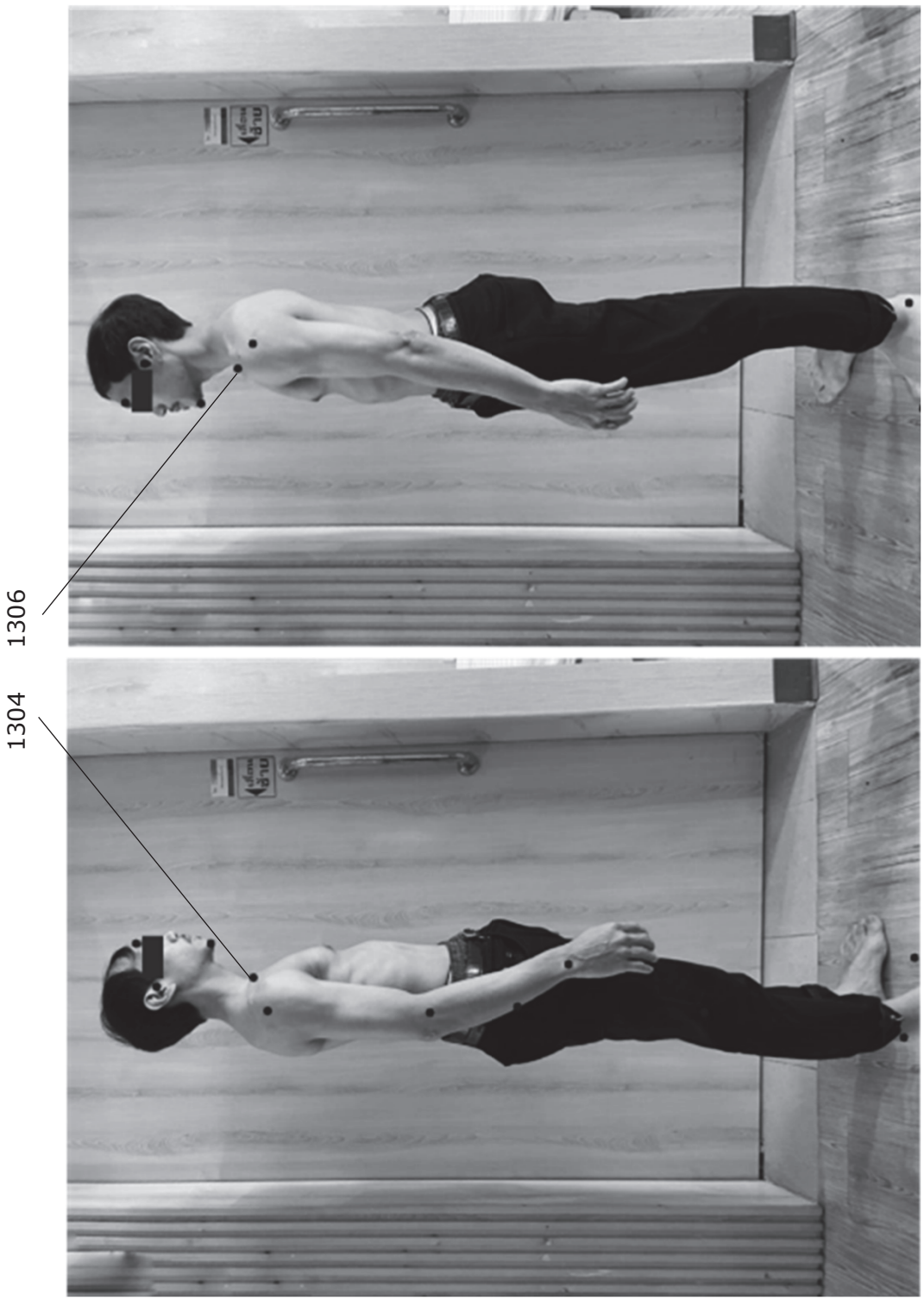


Figure 13

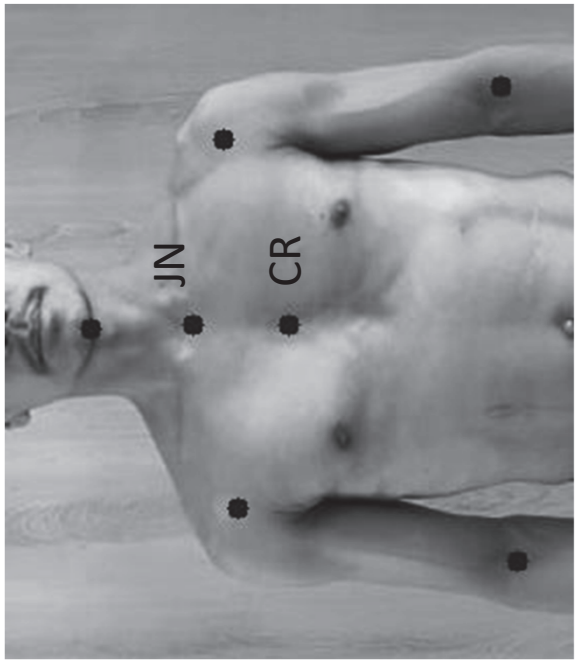


Figure 14

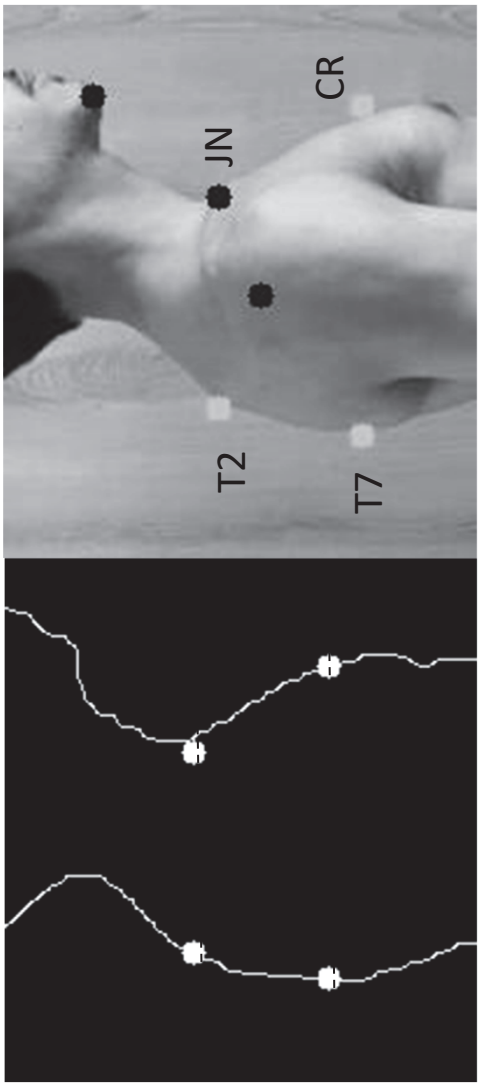


Figure 15A

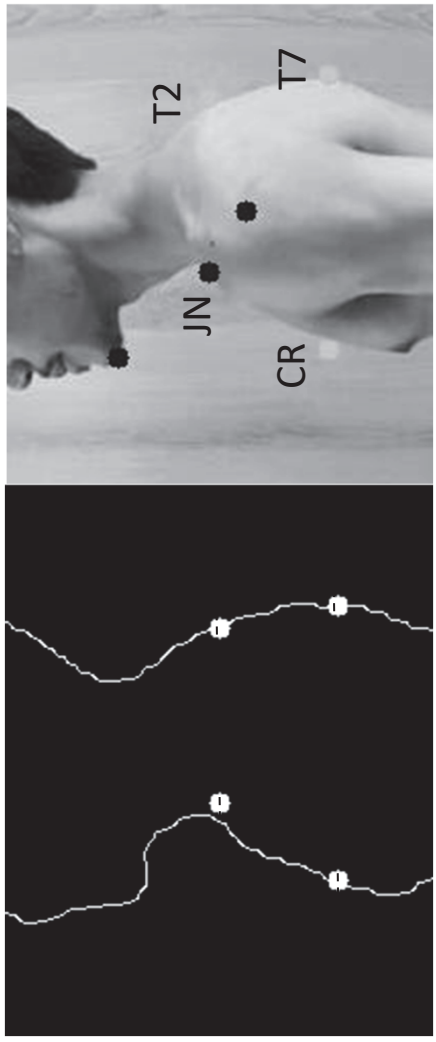


Figure 15B

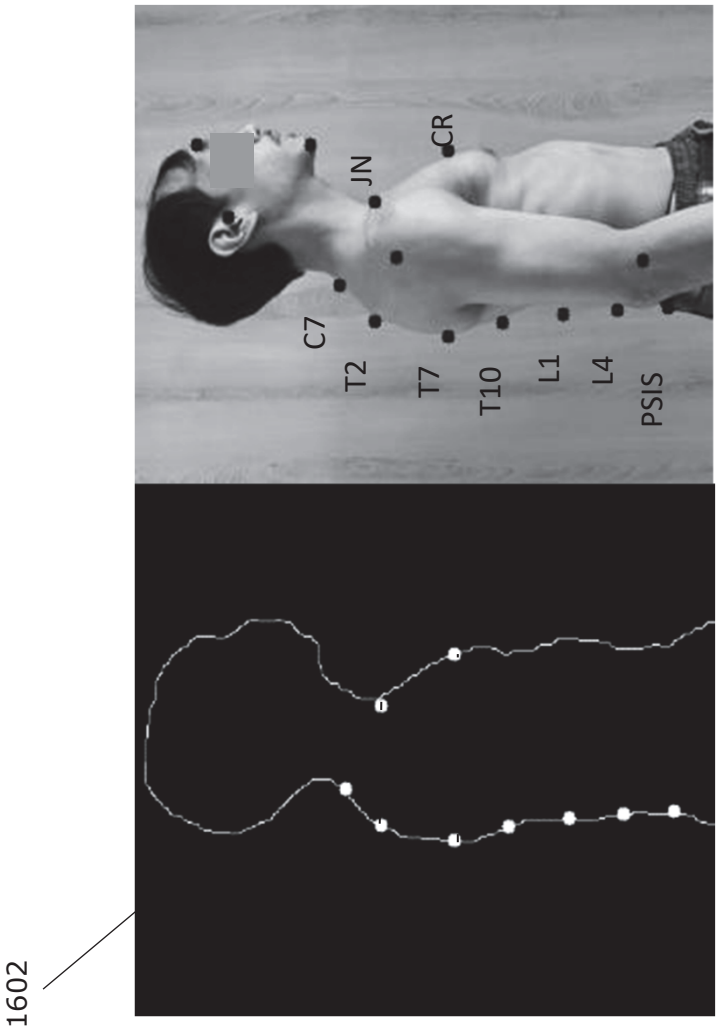
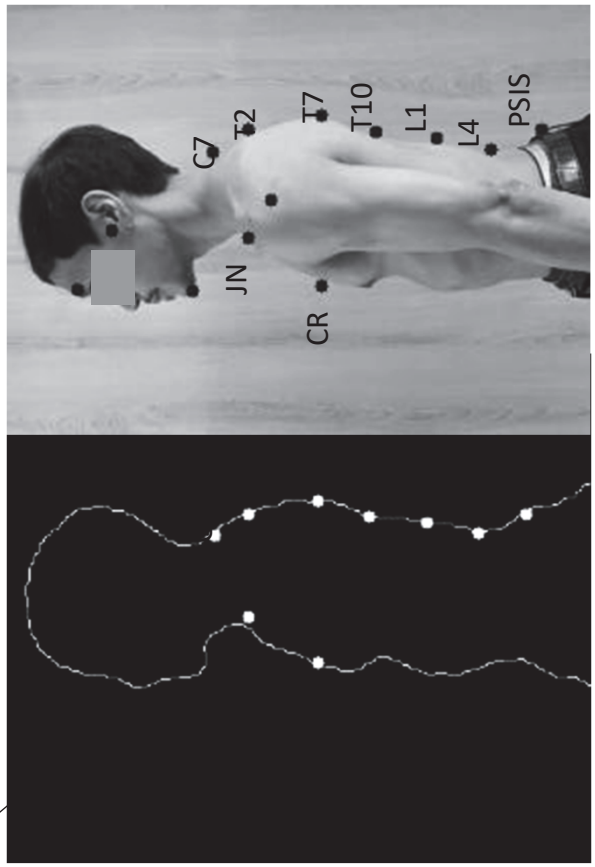


Figure 16



1702

Left lateral view

1700

Figure 17

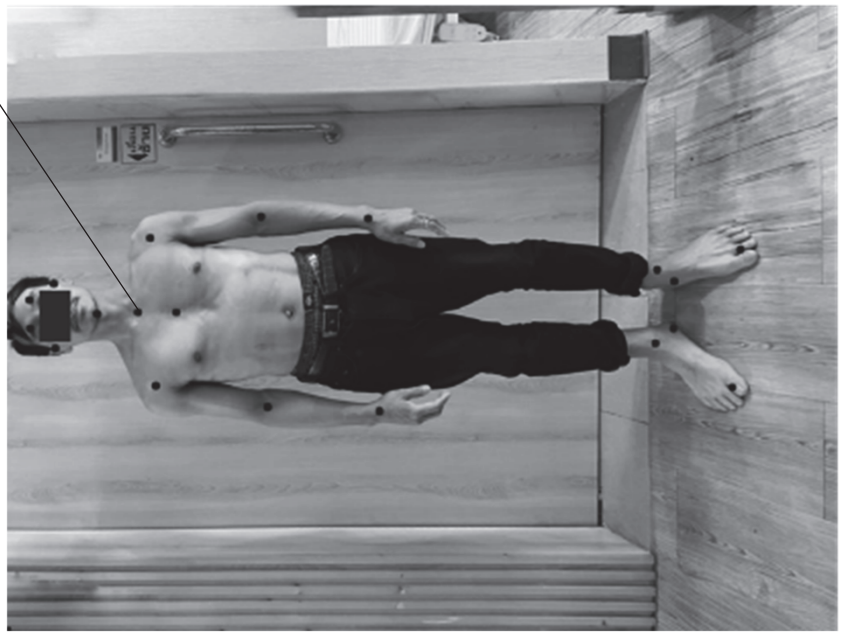


Figure 18

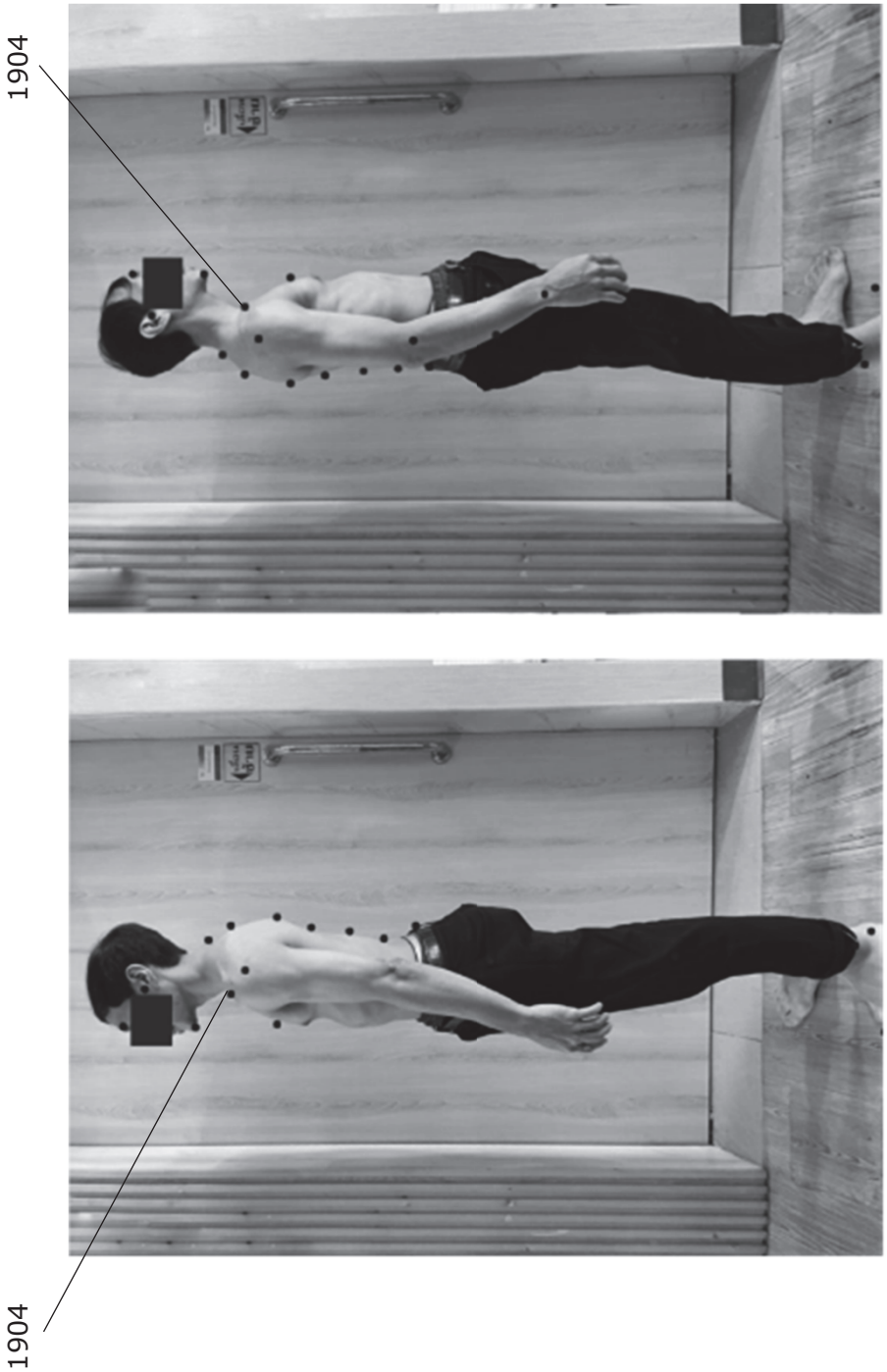


Figure 19B

Figure 19A

Figure 19

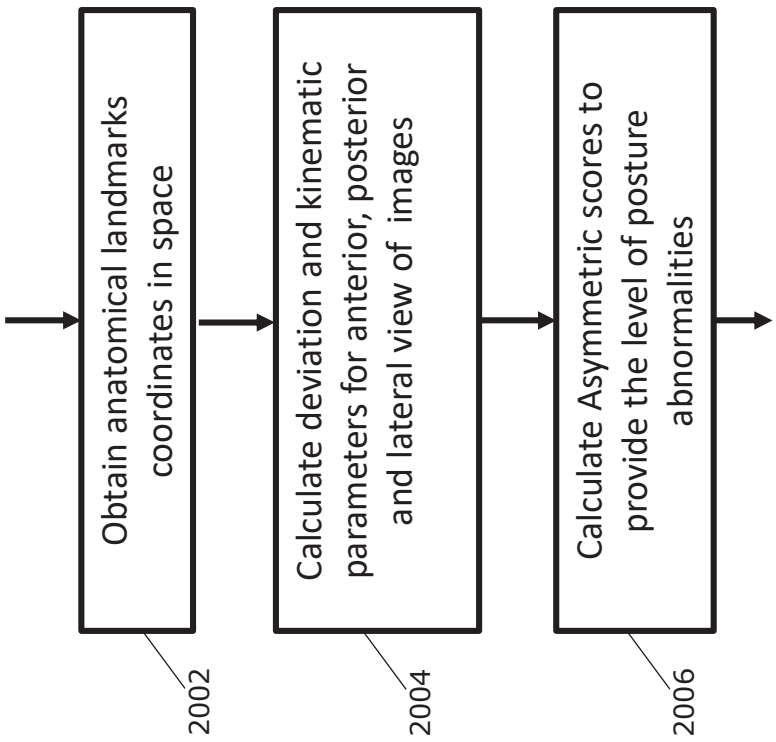

Obtain anatomical landmarks coordinates in space
Calculate deviation and kinematic parameters for anterior, posterior and lateral view of images
Calculate Asymmetric scores to provide the level of posture abnormalities
2002
2004
2006
2000

Figure 20

Shifting (Left/Right) (cm)		Tilting (Up/Down) (◦)	Joint Angle (◦)	Rotation (◦)
Distance from reference segment joint		**With reference to right side**	**Left and Right**	**Left/Right**
Hip	Ankle	Index toe	Ankle	Hip
Shoulder	Hip	Heel	Knee	Shoulder
Chin	Shoulder	Ankle	Hip	Head
Ear	Chin	Hip	Shoulder	
Eye brown	Ear	Shoulder	Head	
		Ear	Knock/bow knee	
		Eye brown	Toe in/out	
		Elbow		
		Wrist		



Figure 21

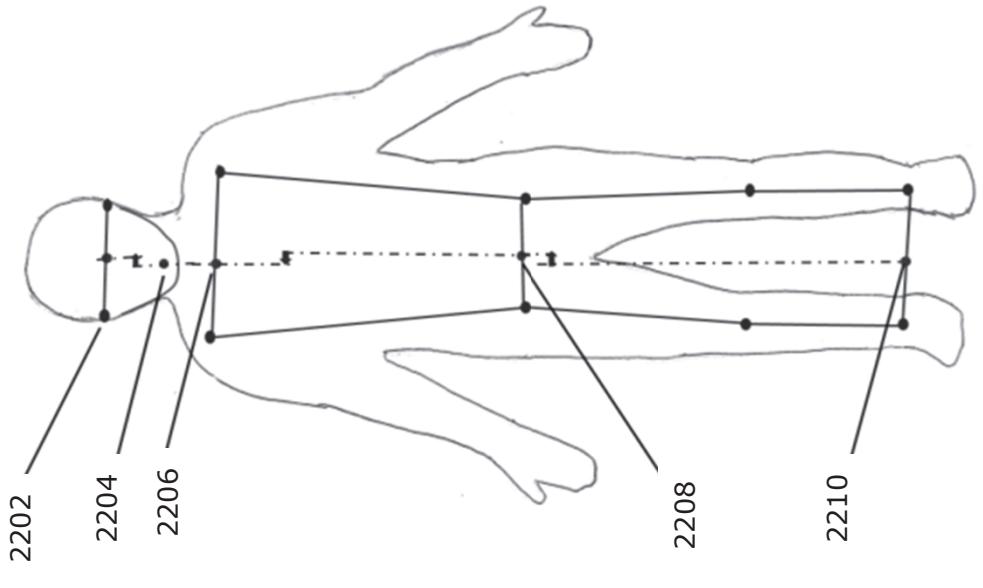


Figure 22A

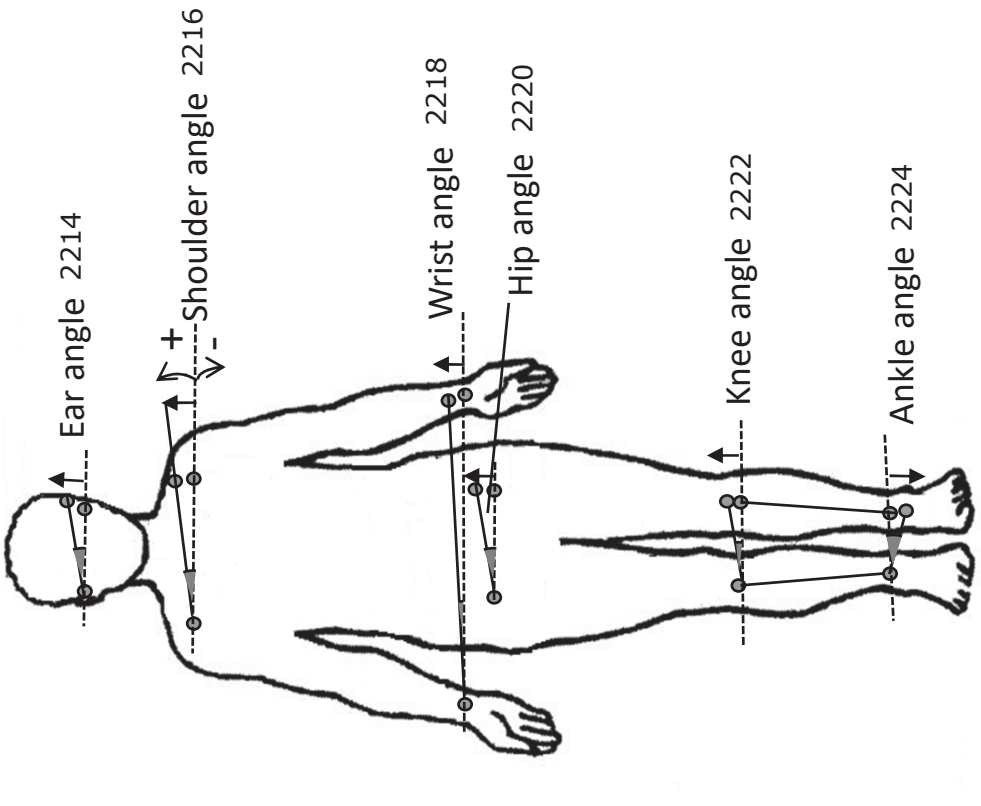


Figure 22B

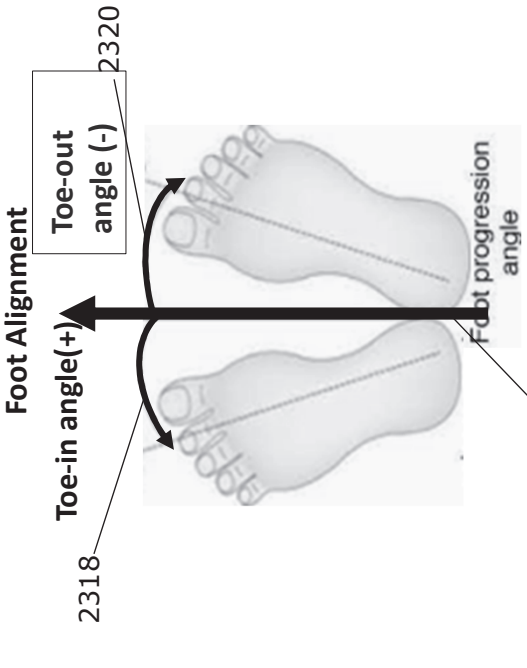


Figure 23B

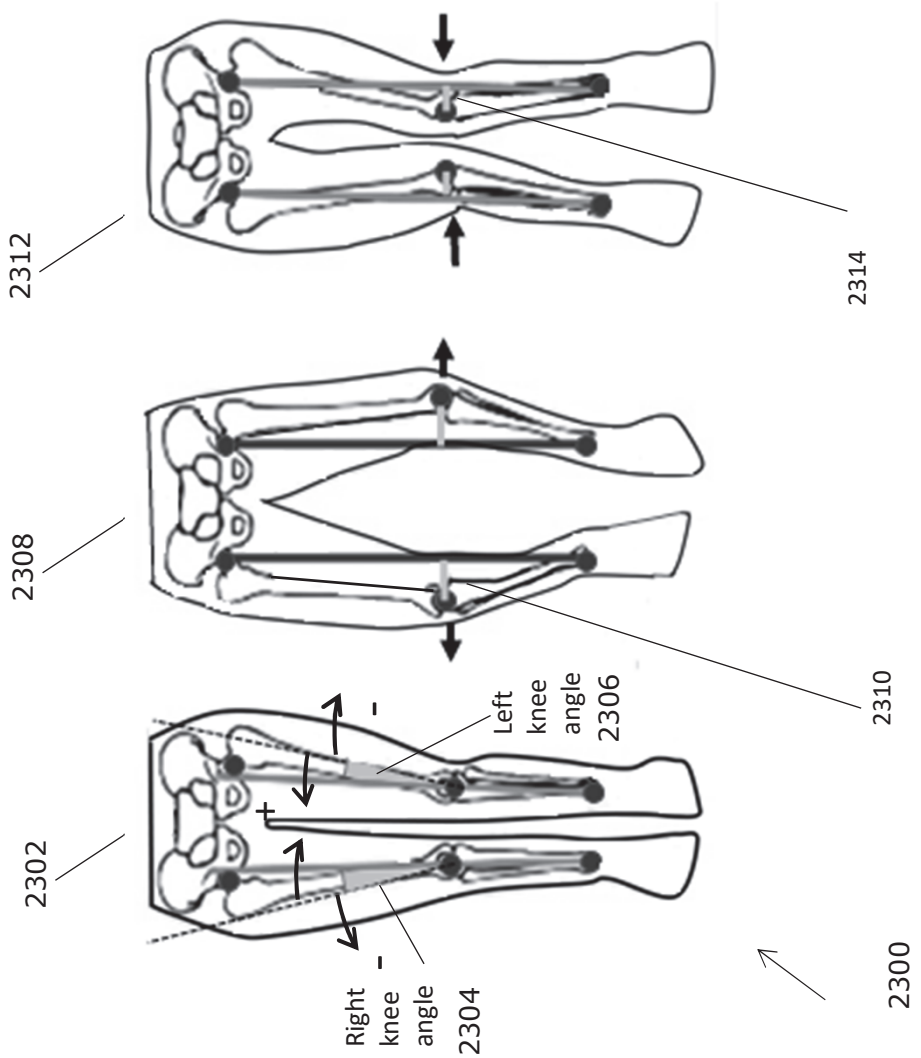
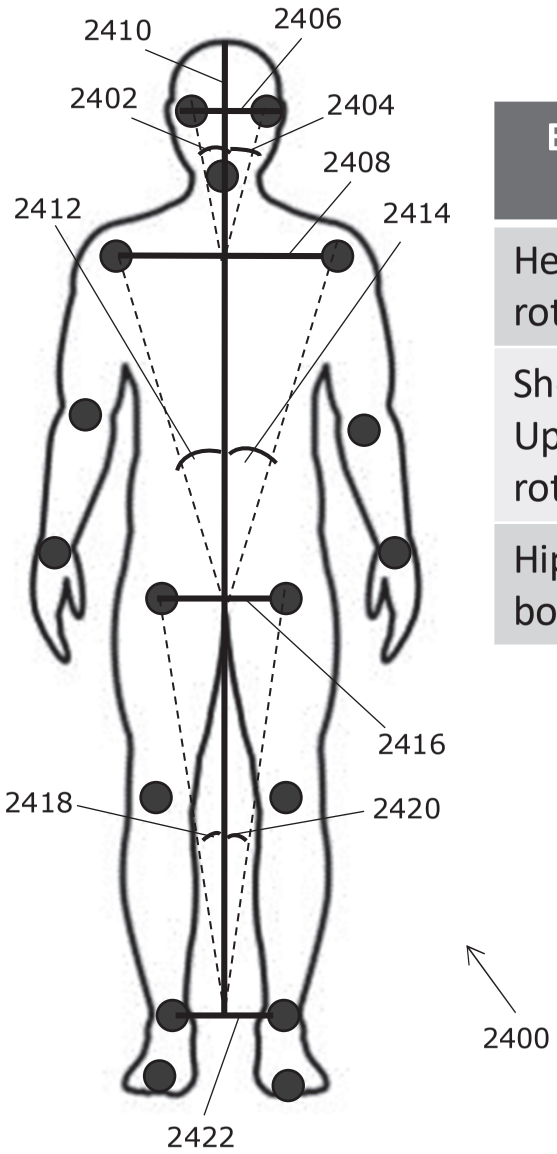


Figure 23A



Body part rotation	Joint Angle (◦)	Left	Right	Remarks
Head rotation	Ear-Shoulder	71.755	72.476	Right to Left rotation
Shoulder or Upper body rotation	Shoulder-Hip	73.571	70.237	Left to right rotation
Hip or lower body rotation	Hip-Ankle	74.619	68.564	Left to right rotation

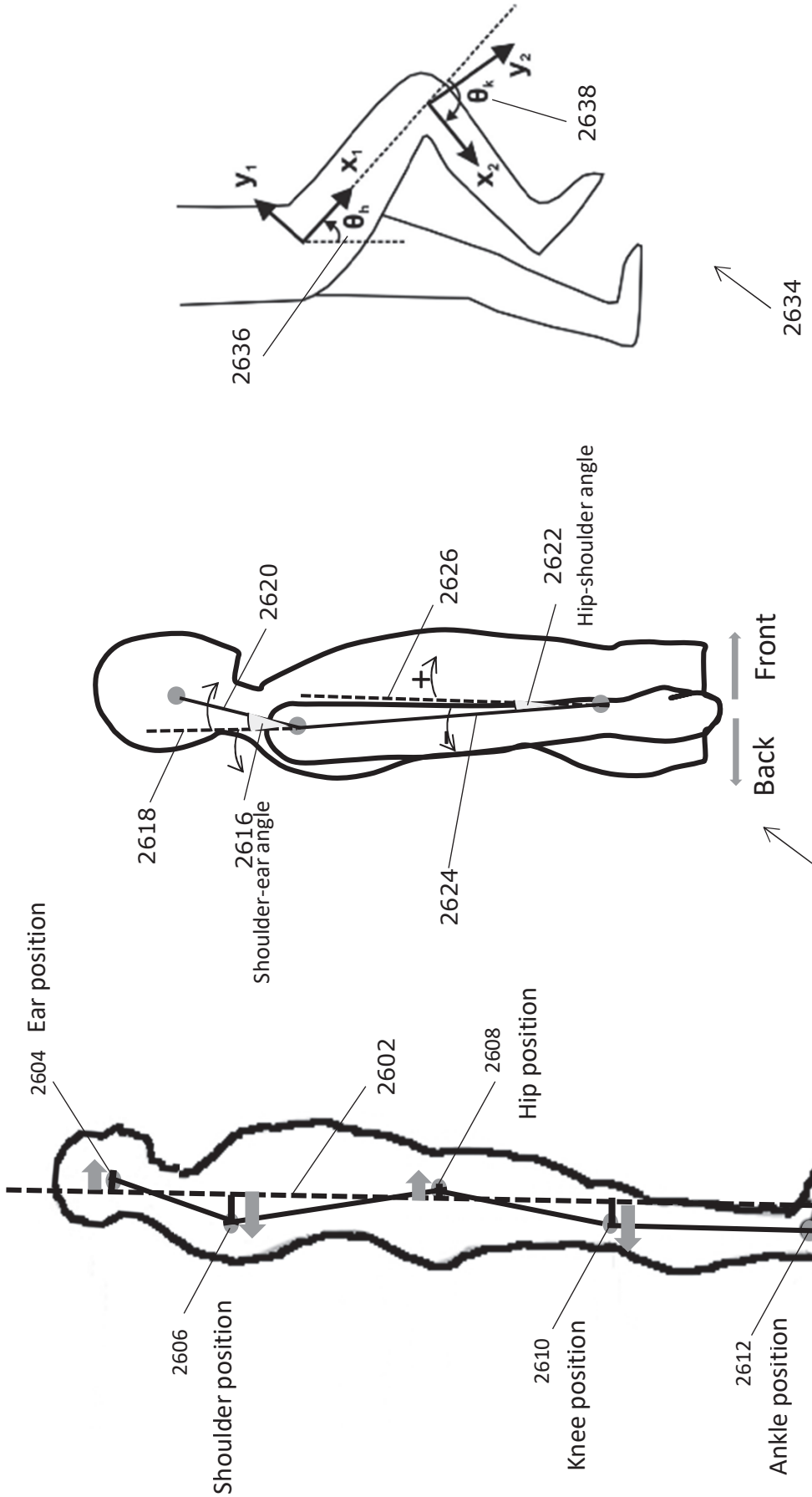
2424

Figure 24

Shifting (Forward/Backward) (cm)	Joint Angle (◦)
Distance from reference plumb line	**Left/Right**
knee	Ankle
Hip	Knee
Shoulder	Hip-shoulder
Chin	Hip angle
Ear	Head
Eye brown	Forward Head Symptom
	Jaw Dropped

2500

Figure 25


Ear position
2604
2602
2608
Hip position
2606
Shoulder position
2610
Knee position
2612
Ankle position
Front
Back
2600
Figure 26A
2618
2620
Shoulder-ear angle
2616
2624
2626
2622
Hip-shoulder angle
Front
Back
2614
Figure 26B
y_1
x_1
θ_h
θ_k
y_2
x_2
2638
2636
2634
Figure 26C

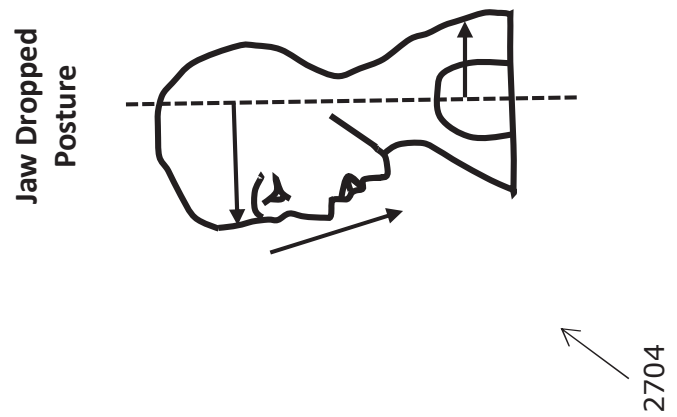


Figure 27B

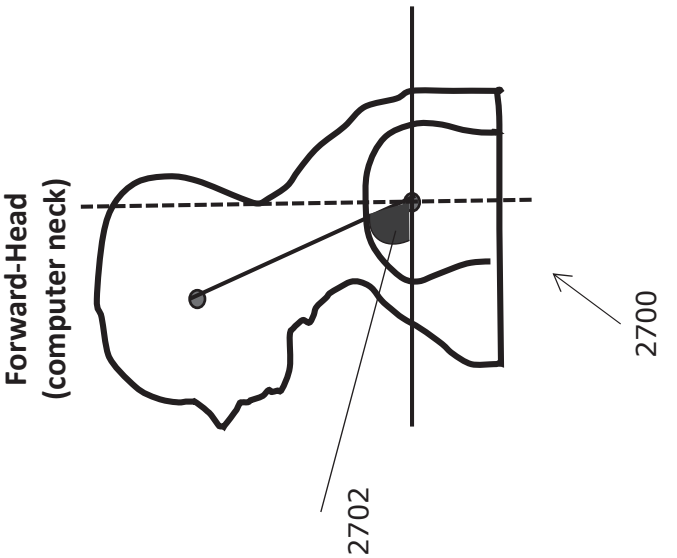


Figure 27A

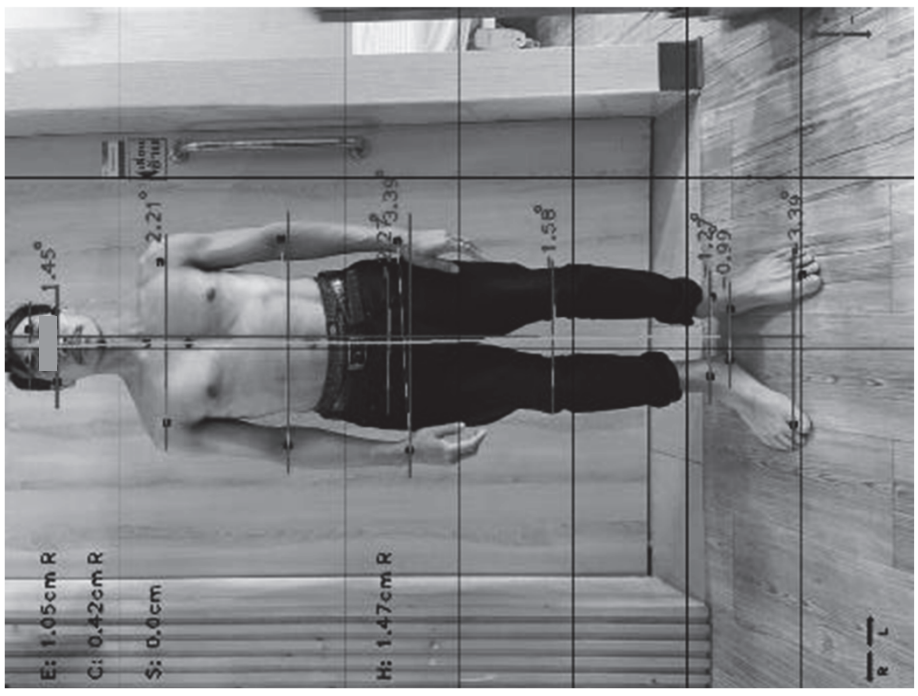


Figure 28A

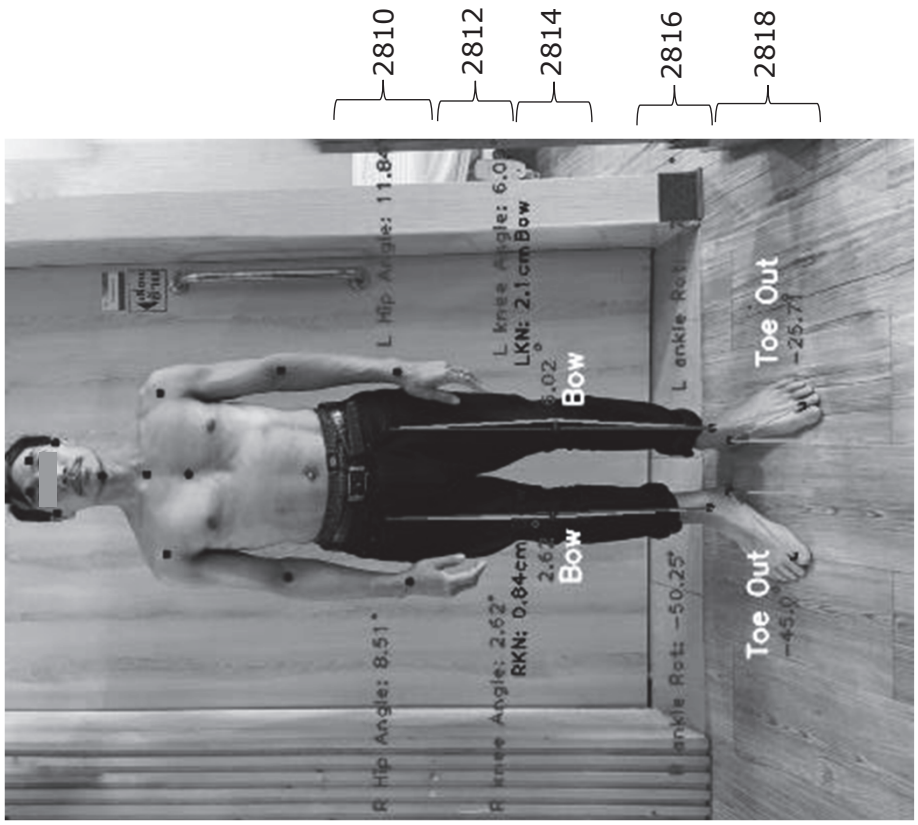


Figure 28B

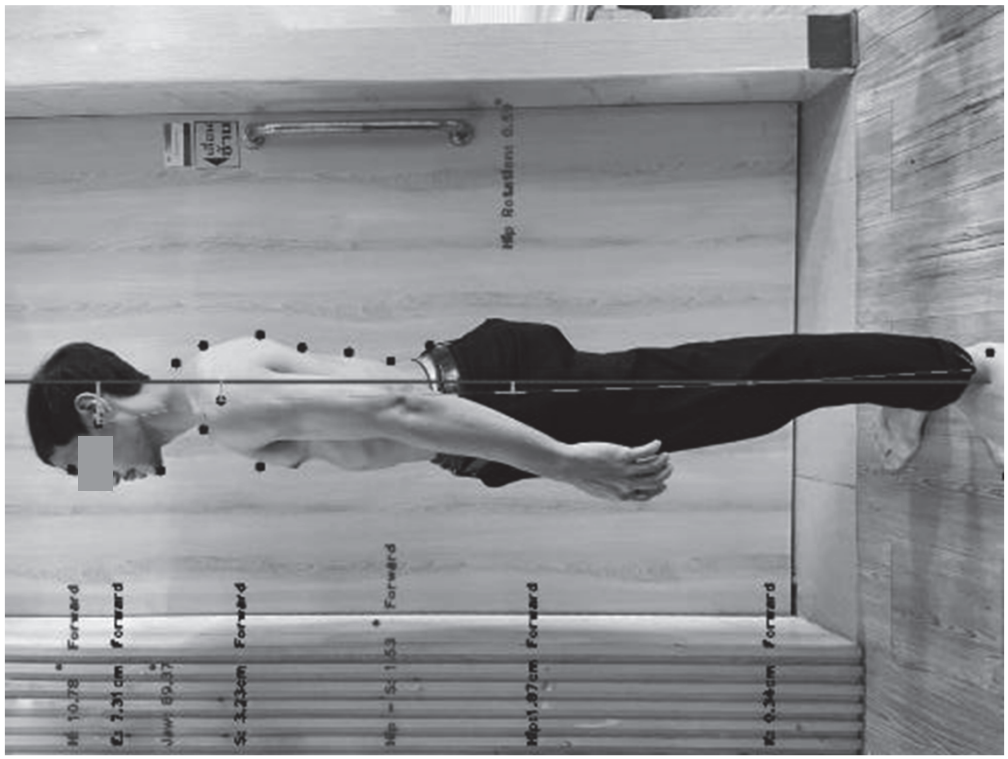


Figure 29B

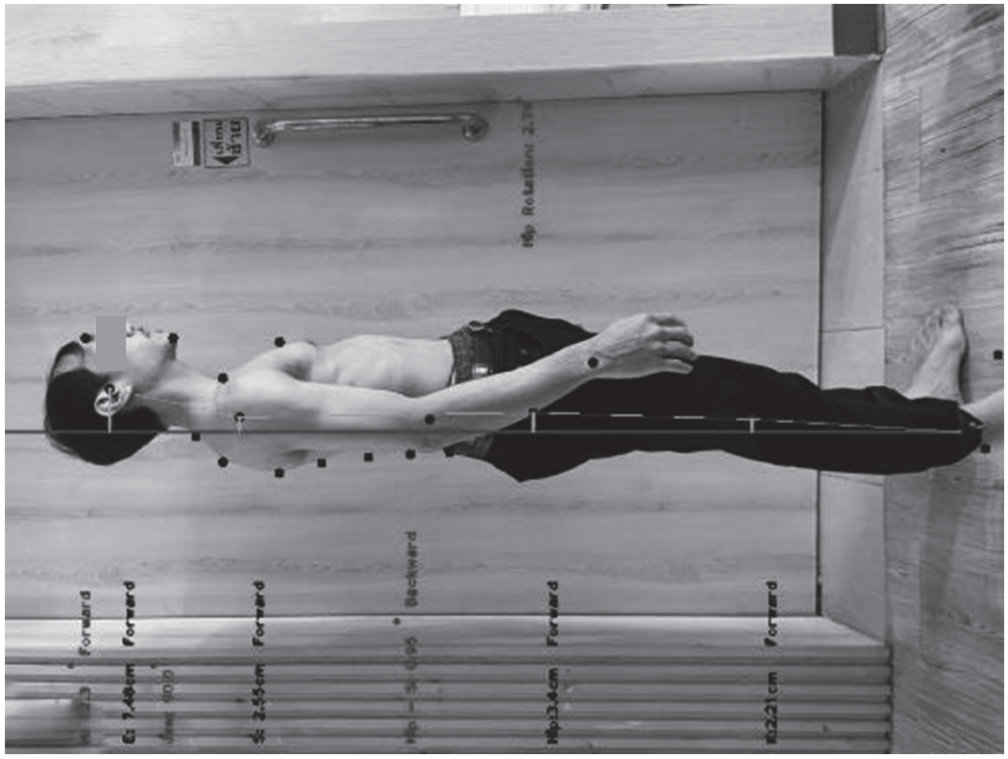


Figure 29A

Anterior view		Lateral view	
Head rotation ASI	0-10	Ear distance ASI	0-10
Shoulders rotation ASI	0-10	Chin distance ASI	0-10
Hips rotation ASI	0-10	Shoulder distance ASI	0-10
Knee XO ASI	0-10	Hip distance ASI	0-10
Toe In/Out ASI	0-10	Knee distance ASI	0-10
Total score (0-100)	0-50		0-50

Very Poor	Poor	Moderate	Good	Very Good
81-100	61-80	41-60	21-40	0-20



3000

Figure 30

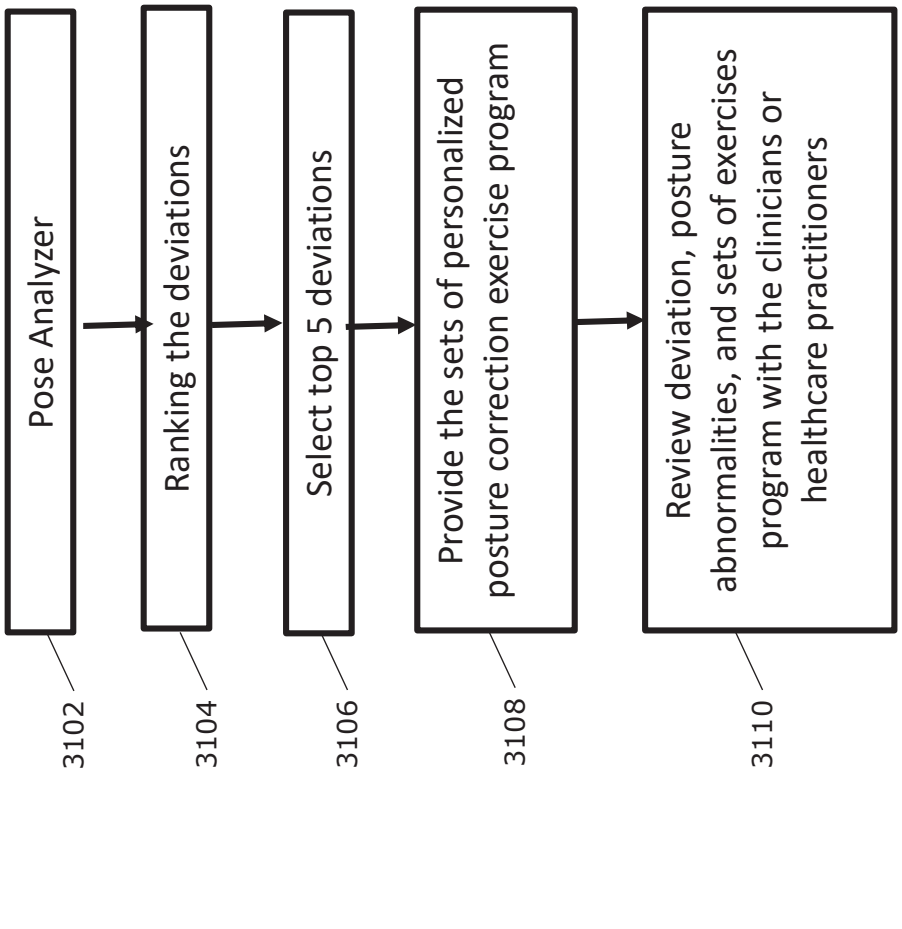

Pose Analyzer
Ranking the deviations
Select top 5 deviations
Provide the sets of personalized posture correction exercise program
Review deviation, posture abnormalities, and sets of exercises program with the clinicians or healthcare practitioners
3102
3104
3106
3108
3110
3100

Figure 31

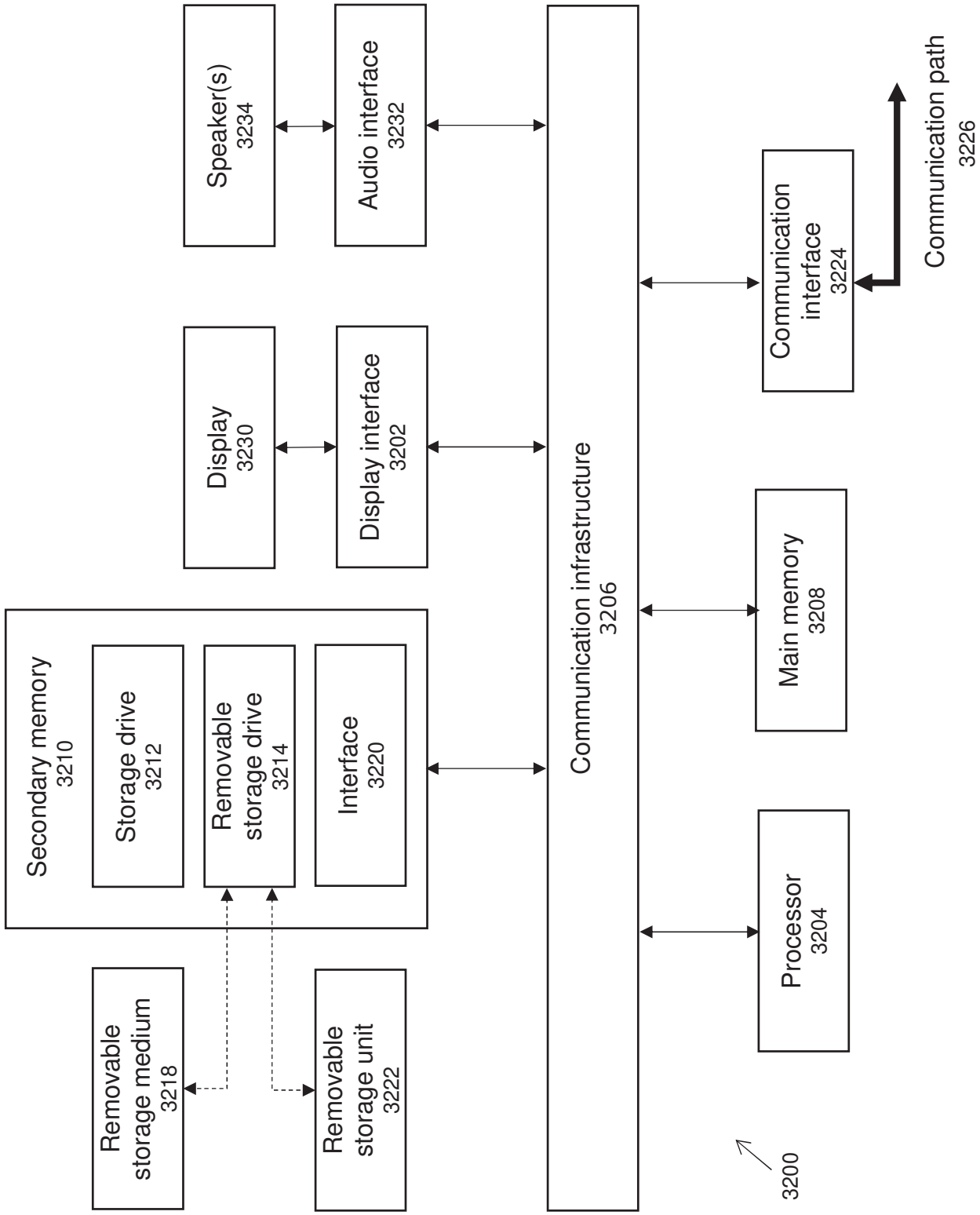

Speaker(s)
3234
Audio interface
3232
Display
3230
Display interface
3202
Secondary memory
3210
Storage drive
3212
Removable storage drive
3214
Interface
3220
Communication infrastructure
3206
Communication interface
3224
Communication path
3226
Main memory
3208
Removable storage medium
3218
Removable storage unit
3222
Processor
3204
3200

Figure 32