Section 5

Examination of Whole Body

The QDR-2000 can create scans of the entire skeleton. BMC and BMD can be assessed for the entire body, as well as for individual regions of the skeleton. The examination procedure involves the following steps:

- Setup positions the patient
- Scan acquires an image of the patient's whole skeleton
- Analysis includes procedures that result in a report

Setup

Setup is a procedure used to prepare the patient for scanning. In this case, the patient is positioned before you select the scan type.

Choose **Scan** from the main Selections Menu.

The Scan Type Selection Screen displays. See *Scan Type Selection* in Section 2 for a screen display.

Patient Positioning

Position the patient on the table before you select scan type and scan parameters. Use the following procedure for patient positioning:

1.   Verify that the patient has no removable metal objects on her body, such as snaps, belts, underwire bras, jewelry, and so on. Have the patient remove her shoes.

2.   Verify that the examination table is centered with respect to the cabinet beneath it. If not, use table motion controls on the c-arm to center it. If desired, use c-arm controls to move the c-arm out of the way so that the patient has better access to the table.

From Hologic QDR 2000 operator's Manual

3. Have the patient lie supine on the examination table with the patient's head at the right end of the table (when the operator faces the table). Position the patient's body so that it is straight on the mat, as measured against the solid longitudinal whole body lines on the mat. Verify that the patient's head is positioned just below the lateral line at the head end of the mattress.
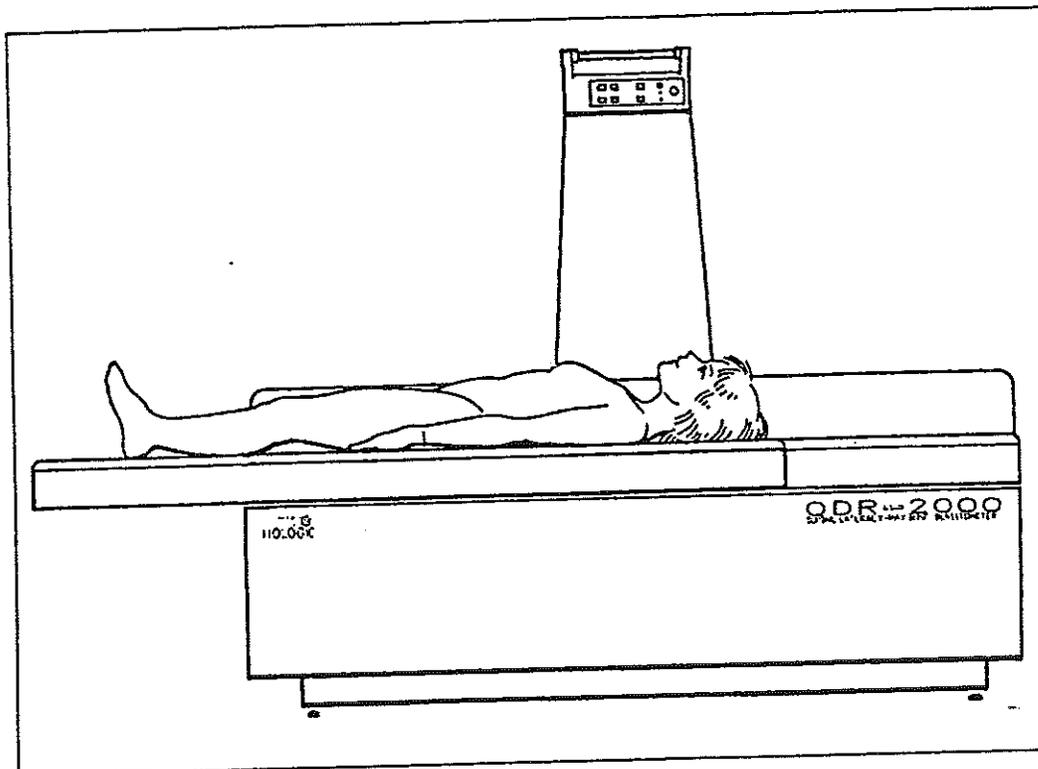

Figure 5-1. Patient on Scan Table for Whole Body Scan

4. The patient's feet should be within the foot limit line at the foot of the table. If the patient is taller than 6 feet 6 inches (198 cm), bend the patient's knees to keep feet within the scan limit line. A radiolucent foam cushion can be placed beneath the patient's knees for comfort--use commercially available cushions for X-Ray positioning, *not* the spine scan foot rest.

5. Tape the patient's ankles together, especially if the scan will be used for comparison purposes. Positioning, including hand and foot positions, must be consistent from scan to scan.

Examination of Whole Body

6.   Place patient's arms at the patient's side, palms down, with a separation from the thighs. Verify that arms are within whole body scan limit lines on the mattress. A large patient can place hands vertically next to the thighs to ensure that hands and arms remain within limits. For that patient, the hand position should be consistent in future scans.
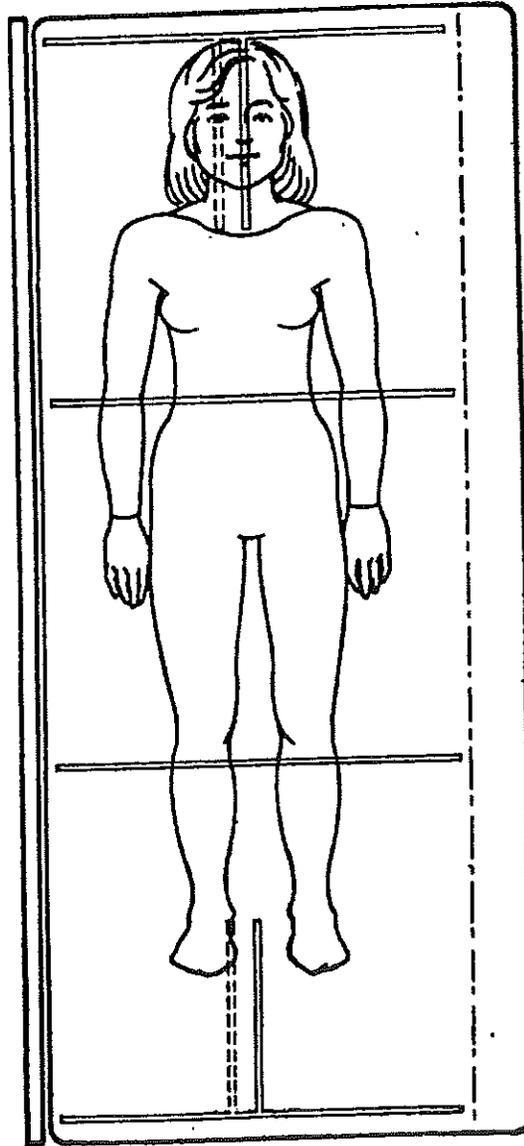

Figure 5-2. Patient Placement on Mattress for Whole Body

There must be space between the patient's arms and sides whenever possible.

Examination of Whole Body

Scan Type Selection

After the patient is positioned, choose **whole Body**.

The whole body Scan Options Menu displays.

```
══════════════════ Hologic QDR 2000 - 7.10 ══════════════════
┌─────────────────────────────────────┐  ┌──────────────────────┐
│ Patient: WHOLE BODY NELLY            │     Room for 192 scans  │
│ Scan type: A Whole Body    Scan # C01179203   Thu, Jul 16, 1992  08:14 │
└─────────────────────────────────────┘  └──────────────────────┘




                    ─── Whole Body Scan Options ───
   ┌────────────────────────────────┐
   │        single Beam             │         Array
   └────────────────────────────────┘

        Press <ENTER> to Select Whole Body Scan
```

The selections available for **whole Body** are:

- **single Beam**
- **Array**

Regardless of which option you choose, a motor positioning screen displays:

```
                    Select Scan Parameters

                    Position the Motors

                 INITIAL MOTOR POSITIONING

      Press any key to begin initial set-up of arm and table

                  <Alt-F10> skips setup motion
```

Press any key to initiate c-arm and table positioning for whole body scanning. The table and c-arm automatically move to the correct starting position. The following message displays while motor positioning takes place:

```
                    Select Scan Parameters

                    Position the Motors

                 INITIAL MOTOR POSITIONING

                    Press any key to abort
```

Single Beam

After motor positioning is complete, the scan parameters screen appears:

```
═══════════════════ Hologic QDR 2000 - 7.10 ═══════════════════
                                              Room for 118 scans
 Patient: LARGE WHOLE BODY  #1
 Scan type: Whole Body          Scan # None   Wed, Jun 10, 1992  10:47
═════════════════════════════════════════════════════════════════

────────────────Select Scan Parameters────────────────
                                          0.18 X 0.30 Coll.
                                          152 lines
   x:y 1:1                                333 samples/line
                                          760 Y pixels
                                          166 X pixels

        Length Of Scan    (inches)    77.9656

        Width Of Scan     (inches)    25.0542

        Line Spacing      (inches)    0.51293

        Point Resolution  (inches)    0.08041

                                          140/70 kVp
          ** DEVICE READY **              2.0 mA avg.
      Press F10 to begin X-RAY scan       868 seconds
                                          60 Hz
```

The Length of Scan for a patient exam is approximately 78 inches (198 cm) and the Width of Scan is approximately 25 inches (63 cm). The Length of Scan can be changed by typing in the desired size at the highlight and then pressing <Enter>. The system may change the number entered to match the pre-programmed step size of the scanning mechanism.

Leave lengths and widths at the default values.

The applied voltage, tube driving current and cumulative exposure time are annotated on the lower right portion of the monitor.

The dimensions of the collimator (inches), the number of lines scanned, and the number of samples per line (resolution) are displayed on the upper right corner of the screen. *Line spacing* is the distance between each step of the c-arm and *Point Resolution* is the distance between samples along each line. Line Spacing for whole body is 0.513 inches (1.303 cm) and Point Resolution is 0.0402 inches (0.102 cm). These values are normally fixed and cannot be operator-adjusted.

Examination of Whole Body

Array

Array whole body scans are acquired using a *Skewed Swath* data acquisition technique. This is a scanning pattern that minimizes fan beam parallax effects by scanning at a 45° angle with respect to array orientation. Scan time is 5 minutes and 20 seconds.
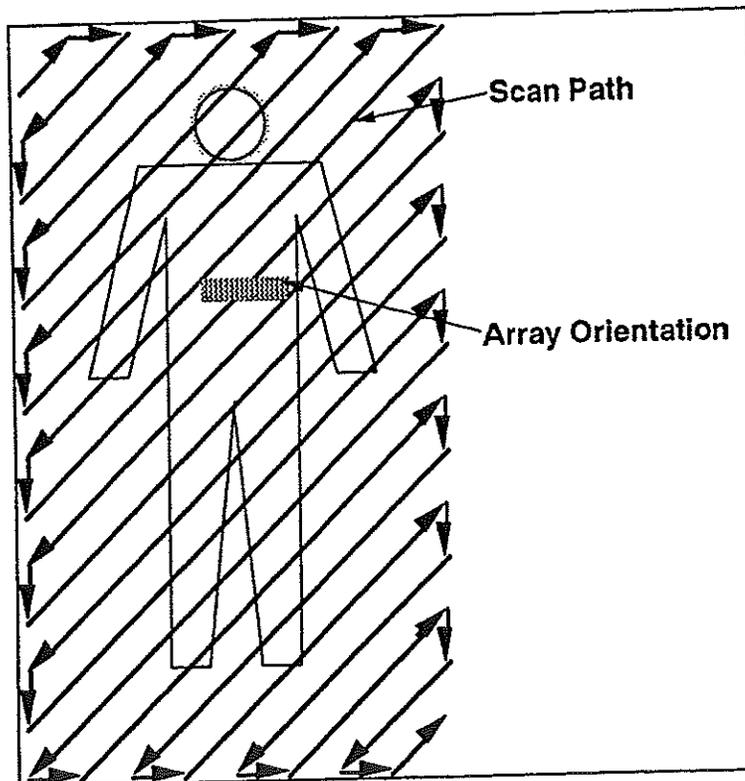

Figure 5-3. Whole Body Array Scanning Path

If you chose **Array**, this screen displays:

```
╔══════════════ Hologic QDR 2000 - 7.10 ══════════════╗
║ Patient: LARGE WHOLE BODY  #1            Room for 117 scans ║
║ Scan type: A Whole Body     Scan # None   Wed, Jun 10, 1992  10:49 ║
╠═══════════════════════════════════════════════════════╣
║            ─────Select Scan Parameters─────           0.94 X 0.08 Coll. ║
║                                                       38 lines         ║
║  x:y 1:1                                              2997 samples/line ║
║                                                       570 Y pixels      ║
║                                                       1498 X pixels     ║
║                                                                        ║
║      Length Of Scan    (inches)      77.9656                           ║
║                                                                        ║
║      Width Of Scan     (inches)      25.0542                           ║
║                                                                        ║
║      Line Spacing      (inches)      1.53873                           ║
║                                                                        ║
║      Point Resolution  (inches)      0.08041                           ║
║                                                                        ║
║                                                    ┌──────────────┐    ║
║      ┌──────────────────────────────┐              │ 140/70 kVp   │    ║
║      │     ** DEVICE READY **        │              │ 2.0 mA avg.  │    ║
║      │ Press F10 to begin X-RAY scan │              │ 223 seconds  │    ║
║      └──────────────────────────────┘              │ 60 Hz        │    ║
║                                                    └──────────────┘    ║
╚═══════════════════════════════════════════════════════╝
```

Scanning

Once scan parameters are set, begin scanning:

1.   Press <F10>.

A tone sounds, together with a flashing red light on the c-arm and a flashing red rectangle on the monitor screen, to indicate that X-Ray scanning is taking place.

Note: If the patient's head is above the line at the head of the mattress, the following message may appear:

```
┌─────────────────────────────────────────────────────────┐
│                                                         │
│           First scan line must be in air                │
│                                                         │
└─────────────────────────────────────────────────────────┘
```

If this message displays, move the patient so his head is below the line, then restart the scan.

An image appears on the monitor screen one line at a time, from the top (head) down, as it is acquired.

2.   When the entire skeleton appears on the screen, press any key to stop the scan and save it.

A second tone from the system alerts the operator that X-Ray scanning has halted. The analysis screen appears automatically in a few seconds.

Enhanced Whole Body Analysis

Array Whole Body scans are analyzed by a new analysis protocol that improves the accuracy of the whole body measurement. This analysis protocol is called **Enhanced Whole Body.**

Enhanced Whole Body is the default analysis algorithm for Array Whole Body scans and the standard whole body algorithm is used as a default for single beam whole body scans. Both algorithms are available for both types of scans. The protocol used is printed on the reports.[1] Figure 5-4 shows the default analysis modes in solid lines. The dashed lines represent analysis options available through the Analysis Protocol Menu and are provided upon request.

scan

Single Beam
Whole Body

Array
Whole Body

analysis

Standard Whole
Body Analysis
Protocol

Enhanced Whole
Body Analysis
Protocol

Standard Whole
Body Analysis
Protocol

Enhanced Whole
Body Analysis
Protocol
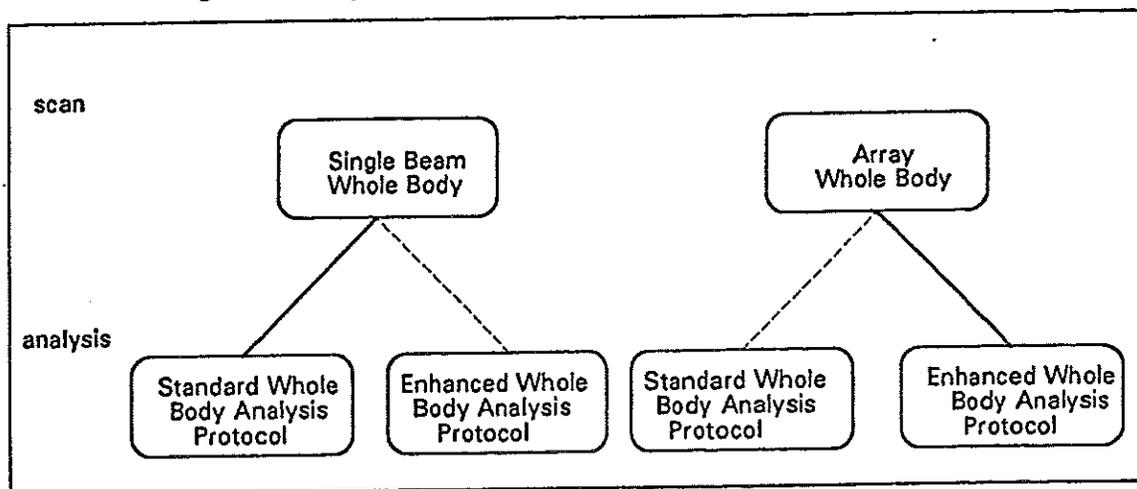
Figure 5-4. Whole Body Analysis

Hologic recommends that individuals followed-up longitudinally be evaluated by the same scan and analysis protocols. While studies show that both modes of scanning and analysis are equivalent and highly correlated, results for bone and

---

[1]The protocols are annotated on the report as "Whole Body Vx.xx" for standard whole body analysis protocol and as "Enhanced Whole Body x.xx" for enhanced whole body analysis protocol.

body composition may vary by a few percent between the two analysis modes. On average, based on a subset of 349 individuals from the Hologic whole body reference data set, BMD increased by .59%, BMC decreased by 3.45%, lean body mass decreased by 2.19% and %Fat increased by 1.42%. There was no change in total body mass.

Whole body scans analyzed by the **Enhanced Whole Body** protocol use their own reference database. This database was derived from the same individuals as the database for the standard whole body algorithm.

Analysis

After scanning, an Analysis Selection Screen displays. See *Analysis* in Section 2 for information and screen displays.

The whole body analysis procedure consists of the following steps:

1. Image adjustment
2. Region selection
3. Report Generation

Image Adjustment

Contrast and brightness of the displayed image should be adjusted, if necessary, to give the best definition to the whole body skeleton. If adjustment is required, see *Image Adjustment* in Section 2 for adjustment procedures.

Region Selection

The scanned image appears on the screen, together with yellow lines defining regions to be analyzed. Two views of the same image display; the view on the right below is a zoomed portion of the image on the left.
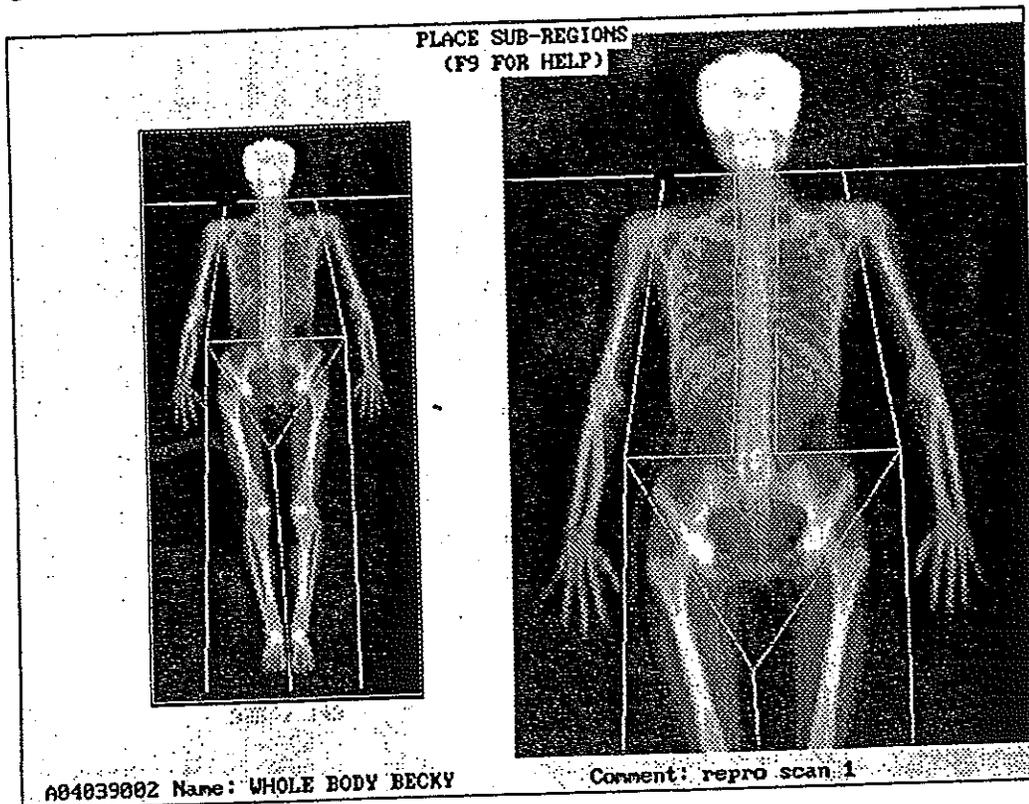

Figure 5-5. Place Subregions

Using the procedure described below, set the analysis regions as follows:

- The horizontal line above the shoulders should be just below the chin.
- The vertical lines at the shoulders should be between the head of the humerus and scapula at the glenoid fossa.
- The vertical lines on either side of the spine should be moved close to the spine, angled to match the curvature if possible.
- The small horizontal line should be approximately at the level of L1-T12.
- The horizontal line above the pelvis should be just above the crest of the ilium. This line can be extended out at the sides to include soft tissue in the chest and waist. If at all possible, soft tissue from the trunk should not be included with the arms. Due to patient size and placement of the hands, this may not always be possible.
- The angled lines below the pelvis should bisect both femoral necks.

- The vertical line between the legs should be adjusted to be between the feet.
- The vertical lines lateral to (outside of) the legs should be adjusted to include as much of the soft tissue in the thighs as possible.

Use the following procedure:

1. Use <PgUp> and <PgDn> to select the desired line as the active line. <PgUp> selects lines in the counterclockwise direction and <PgDn> selects in the clockwise direction. When a line is selected, it becomes blue and can be moved as a unit.

2. Use the arrow keys to move the active line to the desired location.

3. Start with the blue cross at the upper left of the image (as the operator faces the screen). The first adjustments are coarse adjustments of lines, followed by fine adjustments using individual points.

4. Press <PgDn>. The line under the chin becomes active (blue). Bring this line just under the chin.

5. Press <PgDn> twice. The line to the left of the spine becomes active. Bring this line so that it is just to the left of, but not touching, the spine.

6. Press <PgDn> once. The line to the right of the spine becomes active. Bring this line so that it is just to the right of, but not touching, the spine.

7. Press <PgDn> twice. The horizontal line across the spine becomes active. Bring this line so that it is approximately at the level of T12-L1.

8. Press <PgDn> once. The horizontal line marking the top of the pelvis becomes active. Bring this line so that it is just above, but not touching, the Iliac crest.

9. Press <+> or <-> to bring the active (blue) cross back to the upper left of the image.

10. Use arrow keys to angle the line to pass through the left glenoid fossa between the head of the humerus and scapula.

11. Press <+>. Adjust this point as close to the left side of the neck as possible, without touching the spine.

12. Press <+>. Adjust this point as close to the right side of the neck as possible, without touching the spine.

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13. Press <+>. Use arrow keys to angle the line to pass through the right glenoid fossa between the head of the humerus and scapula.

14. Press <+>. Adjust this point close to, but not touching, the left side of the spine.

15. Press <+>. Adjust this point close to, but not touching, the right side of the spine.

16. Press <+>. Adjust this point close to, but not touching, the tissue of the arm. The line should be between the arm and the chest/pelvis.

17. Press <+>. Adjust this point close to, but not touching, the left side of the spine.

18. Press <+>. Adjust this point close to, but not touching, the right side of the spine.

19. Press <+>. Adjust this point close to, but not touching, the tissue of the arm. The line should be between the arm and the chest/pelvis.

20. Press <+>. Adjust this point to bring the sides of the triangular area through the femoral necks and just below the ischium.

21. If desired, use <Alt><z> to toggle zooming between upper and lower portions of the image. Use <Home> or <Enter> to back up to the previous step (image adjustment).

22. Press <+>. Adjust this point laterally to the left of the legs. Move the point so that the tissue in the thighs is inside (to the right of) the line. Normally, the line just touches the hand.

23. Press <+>. Adjust this point to be between the feet.

24. Press <+>. Adjust this point laterally to the right of the legs. Move the point so that the tissue in the thighs is inside (to the left of) the line. Normally, the line just touches the hand.

25. When region lines are correctly positioned, press <End> to go on to the next stage.

The system processes the whole body scan image. Due to the large amount of data contained in a whole body scan, processing time is longer than for regional scans.

Report Generation

After analysis is complete, a report screen displays. See *Report Generation* in Section 2 for more information.
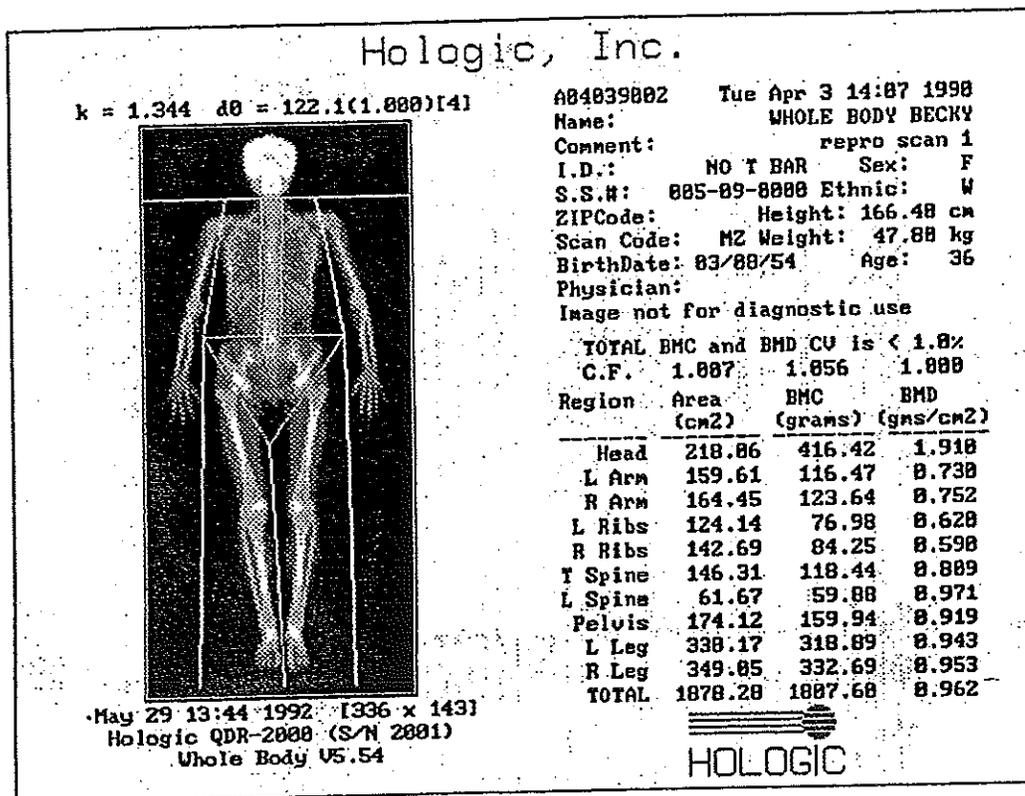


```
                    Hologic, Inc.
                                    A04039002    Tue Apr 3 14:07 1990
 k = 1.344  d0 = 122.1(1.000)[4]    Name:        WHOLE BODY BECKY
                                    Comment:        repro scan 1
                                    I.D.:       NO T BAR    Sex:    F
                                    S.S.#:    005-09-0000 Ethnic:   W
                                    ZIPCode:          Height: 166.40 cm
                                    Scan Code:   MZ Weight:   47.80 kg
                                    BirthDate: 03/00/54      Age:   36
                                    Physician:
                                    Image not for diagnostic use
```

TOTAL BHC and BHD CV is < 1.0%			
C.F.	1.007	1.056	1.000

Region	Area (cm2)	BHC (grams)	BMD (gms/cm2)
Head	218.86	416.42	1.910
L Arm	159.61	116.47	0.730
R Arm	164.45	123.64	0.752
L Ribs	124.14	76.98	0.620
R Ribs	142.69	84.25	0.590
T Spine	146.31	118.44	0.809
L Spine	61.67	59.88	0.971
Pelvis	174.12	159.94	0.919
L Leg	330.17	318.89	0.943
R Leg	349.85	332.69	0.953
TOTAL	1870.20	1807.60	0.962

```
May 29 13:44 1992  [336 x 143]
Hologic QDR-2000 (S/N 2001)
Whole Body V5.54                            HOLOGIC
```

Figure 5-6. Report

Compare

See *Compare* in Section 2 for information on the **Compare** feature.

The **Compare** procedure consists of the following steps:

1. Reference scan selection
2. Image adjustment
3. Region selection
4. Generation of reports

Steps 2 through 4 are carried out in an identical manner as corresponding steps in the analysis stage. The major difference in **Compare**, however, is that the current scan must be analyzed so that anatomical features are identical in the current scan to those of the reference scan.

Scan Selection

See *Scan Selection* in Section 2 for information and a screen display.

Image Adjustment

Contrast and brightness of the displayed image should be adjusted, if necessary, to give the best definition to the whole body skeleton. If adjustment is required, see *Image Adjustment* in Section 2 for adjustment procedures.

Region Selection

Regions defined for the reference scan are duplicated on the current scan. The reference scan cannot be changed. The regional outlines are provided to aid in matching the area to be analyzed on the current scan to that of the reference scan. Numbers appearing under scan images indicate sizes of scan fields. They do not have to match for successful comparison of whole body scans.
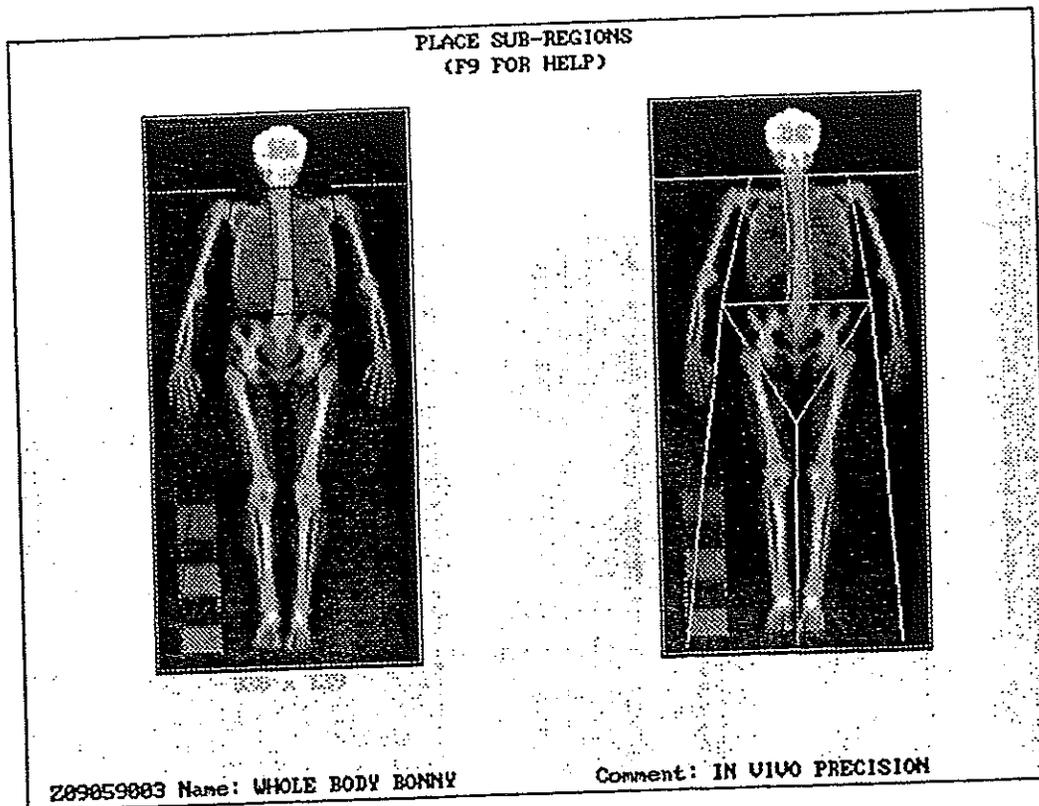
Figure 5-7. Place Subregions

Use the following procedure:

1. Use arrow keys to move the entire set of lines so that they match positions on the reference scan. All lines are active (blue).

2. Use <PgUp> and <PgDn> to select the desired line as the active line. Use arrow keys to move the line.

3. Use <+> and <-> to select a point as the active point. Use arrow keys to move the point.

4. If required, use <Ctrl><Home> to restore lines to their original positions. Use <Home> or <Enter> to back up to the previous step (image adjustment).

5. When region lines are properly positioned, press <End> to go on to the next stage.

Examination of Whole Body

The system processes the whole body scan image. Due to the large amount of data contained in a whole body scan, processing time is longer than for regional scans.

Report Generation

After analysis is complete, a report screen displays. See *Report Generation* in Section 2 for more information.
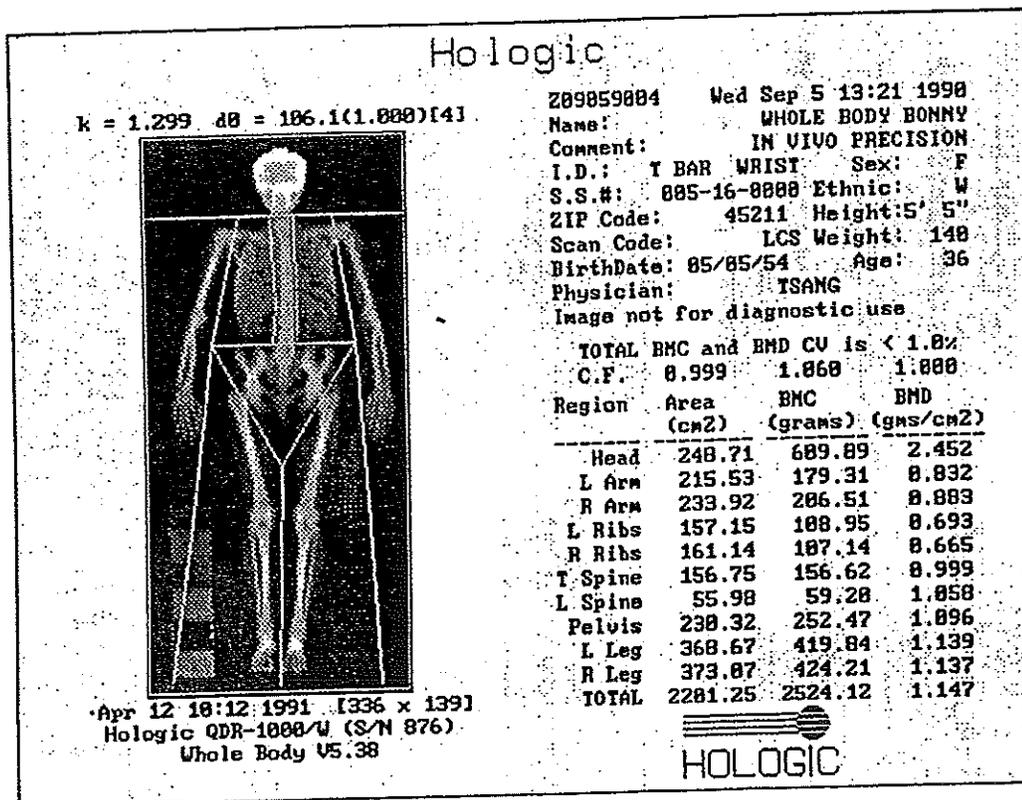
Figure 5-8. Report

Body Composition

> Note: Body composition availability in the U.S.A. is for *investigational use only*. Use of soft tissue analysis on human subjects requires an Investigational Review Board (IRB) evaluation protocol to be submitted before Hologic is permitted to deliver and install the software and phantom.
>
> These instructions assume that the operator is familiar with whole body calcium scan procedures on the Hologic QDR-2000.

Whole Body Scans with the Body Composition Step Phantom

Use the Hologic QDR-2000 to analyze the soft tissue composition of the entire body and to follow the changes in soft tissue composition over time in response to intervention such as diet and exercise. Analysis of fat mass, lean mass, and % fat mass can be reported for the entire body and head, arms, truck, pelvis and legs.

Place a Step Phantom (also called *tissue bar*), provided by Hologic, in the scan along with the patient to perform body composition analysis. The Step Phantom is used for calibration of lean and fat equivalent tissue. Only one scan of the patient is necessary to calculate both bone results and soft tissue results.

> Note: Any whole body scan performed with the Step Phantom in place can be analyzed with or with out tissue results. Even if tissue results are not desired at the time the scan is acquired, *always scan the Step Phantom with the patient*. Then, tissue results can be obtained later; see *Second Report* later in this section.

The QDR-2000 software automatically determines which points in the scan are bone, tissue, and air. The air points are excluded from the analysis of soft tissue. The tissue points and the soft tissue portions of the bone are then compared to the Step Phantom to determine the fat/lean composition. The results are reported as:

- Fat
- Lean, (not including bone mineral)
- Lean combined with bone mineral content (BMC)

Examination of Whole Body

- %Fat. The % Fat is the fat mass divided by the total of the fat mass plus lean mass plus BMC.

You can store the results and use them for future comparisons for patient follow-up.

Patient positioning is the same for soft tissue scans as for whole body calcium scans, see *Patient Positioning* in this section. However, to obtain a soft tissue report, you must scan a calibrated Hologic Step Phantom that is placed alongside the patient. Place the Step Phantom:

- on the patient's right
- parallel with the back edge of the mattress
- with the tall end of the Step Phantom level with the patient's feet. If the patient is very short the Step Phantom can extend below the feet, however, *the entire Step Phantom has to be scanned.*

> **Note:** The Step Phantom should be at least 1 inch (2.54 cm) from the edge of the table and any part of the patient. Place the thick end of the Step Phantom next to the patient's feet.

Due to the sensitivity of the soft tissue analysis, *the patient should wear only a hospital cloth or paper gown for the scan.* To the extent possible, tuck any clothing under the patient, particularly in the region of the scan containing the Step Phantom. Do not allow the gown to lie over the Step Phantom. If a sheet is used to cover the patient, cover the patient, Step Phantom, and the entire table.
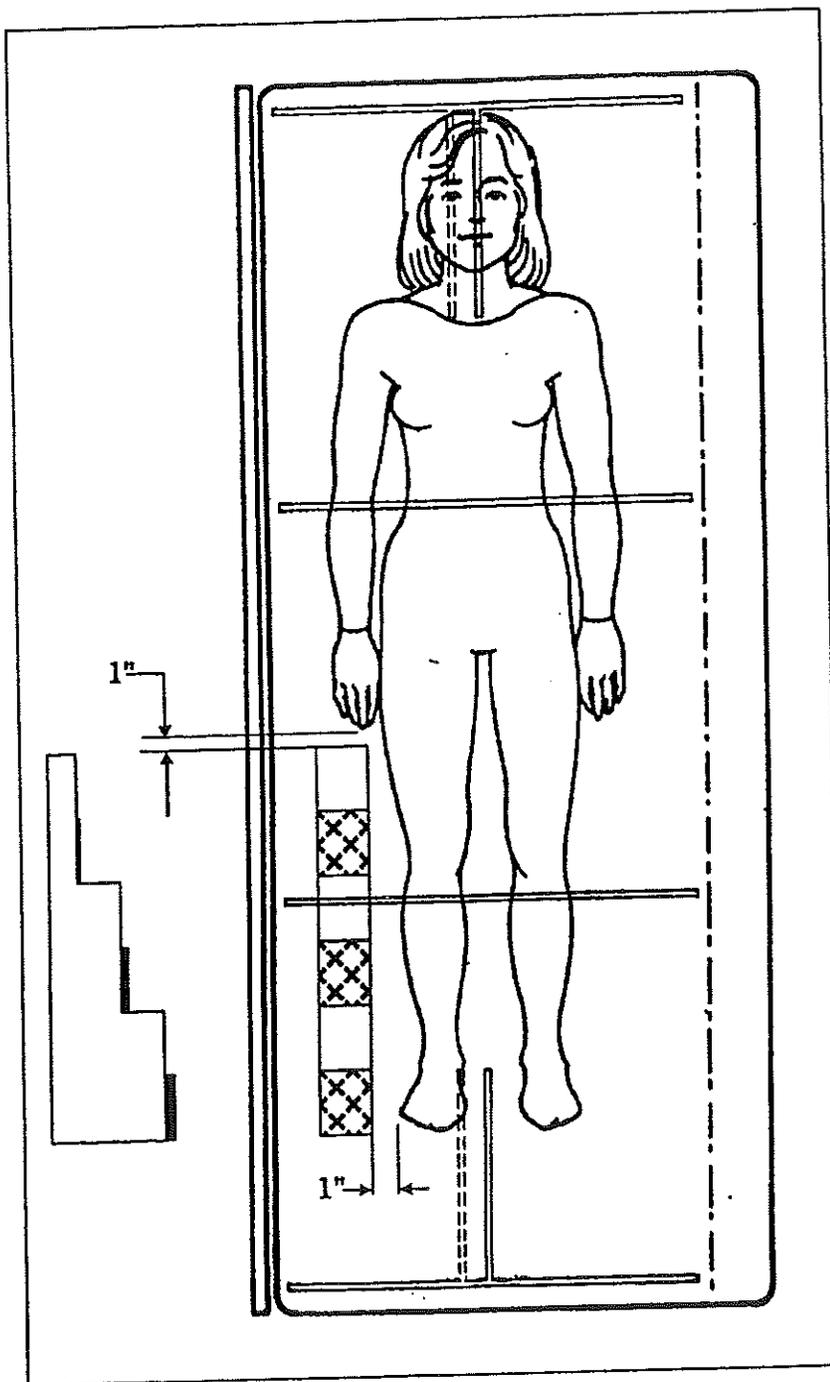
Examination of Whole Body

Figure 5-9. Patient and Step Phantom Placement

Examination of Whole Body

Whole Body Analysis With the Step Phantom

The QDR-2000 must first identify the location of the calibration phantom. This may take a few seconds and occurs whether or not tissue results are desired.

In some cases the following message may appear:

```
Patient file contains no Step Phantom initialization record

Press <F4> to read Step Phantom initialization file.
```

Press <F4>; the analysis continues normally. If this message appears, reanalyze the scan on the same system as the scan was acquired.

If a scan was performed without the Step Phantom the following message appears:

```
Unable to locates Step Phantom. Press F4 to continue.
```

Press <F4> to continue the analysis if the Step Phantom was not scanned. Or, press <Alt><t> if the Step Phantom was scanned but the program failed to locate the phantom.

After the whole body regions have been adjusted, press <End> and the following message appears if the Step Phantom was not scanned.

```
This scan contains no tissue calibration bar.

Press any key to continue Bone Analysis.
```

Report Generation

Press any key and the analysis continues and produces a Whole Body Calcium report. A tissue report can not be generated for a scan done without the Step Phantom. Scan the Step Phantom alongside the patient.

It is possible to select reporting of results for only bone mineral or for combining the analysis of bone mineral and soft tissue for scans performed with the Step Phantom. See the Second Soft Tissue report later in this section for instructions on changing the default analysis from calcium and tissue to calcium only.

Region of Interest

When the Step Phantom is located the system places a red box around the Step Phantom. The red box should outline all six steps of the Step Phantom and should not include any part of the patient or any other object. If the red box needs to be adjusted, press <Alt>-<t>.
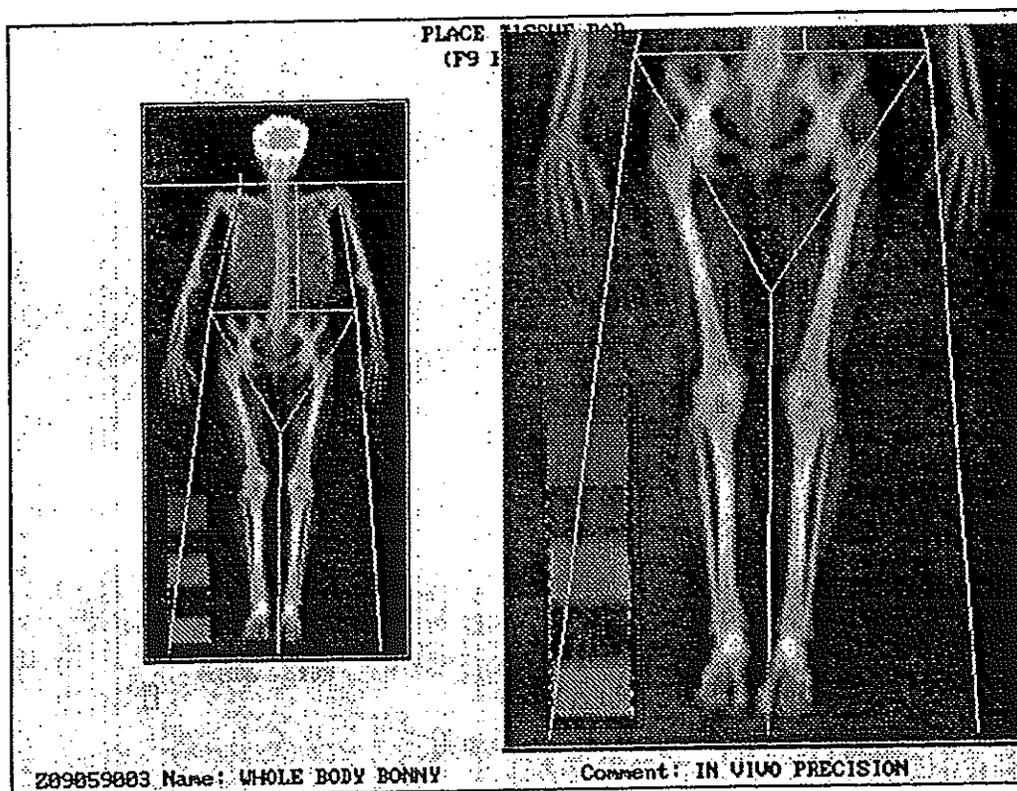

Figure 5-10. Place Step Phantom

You can adjust the tissue box size and location with the same commands used for any ROI box including the moving point *scoliosis* mode; see *Region of Interest* in

Examination of Whole Body

Section 2 for the standard ROI commands. The tissue box turns blue when it is moveable.

> **Note:** Do not include any part of the patient in the tissue box. Include all six steps of the Step Phantom in the tissue box.

When the adjustment of the tissue box is finished, press <Alt>-<t>.

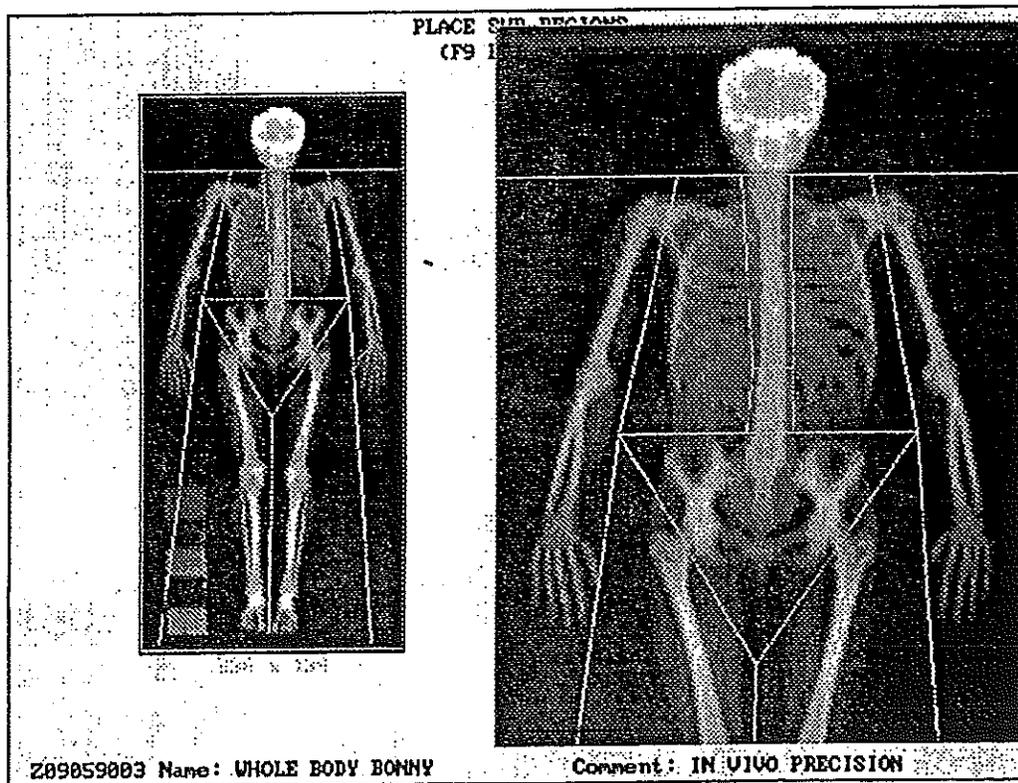The system redraws the Step Phantom outlined in red.

Figure 5-11. Place Subregions

Next, place subregions. This is the same procedure as for whole body calcium scans; see *Region Selection* in this section for a description of the commands for adjusting the ROI and analyzing a whole body scan.

To correctly report the soft tissue values, adjust the region to place soft tissue in the correct regions. For example, adjust the leg regions such that the thigh tissue is located within the appropriate leg region, not the arm regions. In some patients it may be necessary to have a small part of the hands in the thigh regions to have

soft tissue in the correct area. The yellow sub region lines may overlap the tissue box. When the adjustment of the subregions is finished, press <End>.

The system calculates Fat mass, Lean mass, % of Fat of the soft tissue and area, and MC and BMD of the skeleton. The soft tissue calculations take place after the bone calculations. Computation takes longer than for BMC calculations performed without soft tissue analysis.

When the calculations finish, the report appears on the screen. The first page is the same as the whole body calcium report; see *Report Generation* in *Compare* for a screen display.

This report provides the Area (cm^2), BMC (grams), and BMD (grams per cm^2) for the head, arm, ribs, thoracic and lumbar spine, pelvis, legs, and for the total body.

BMC Report

To obtain the first soft tissue report, press <PgDn>.

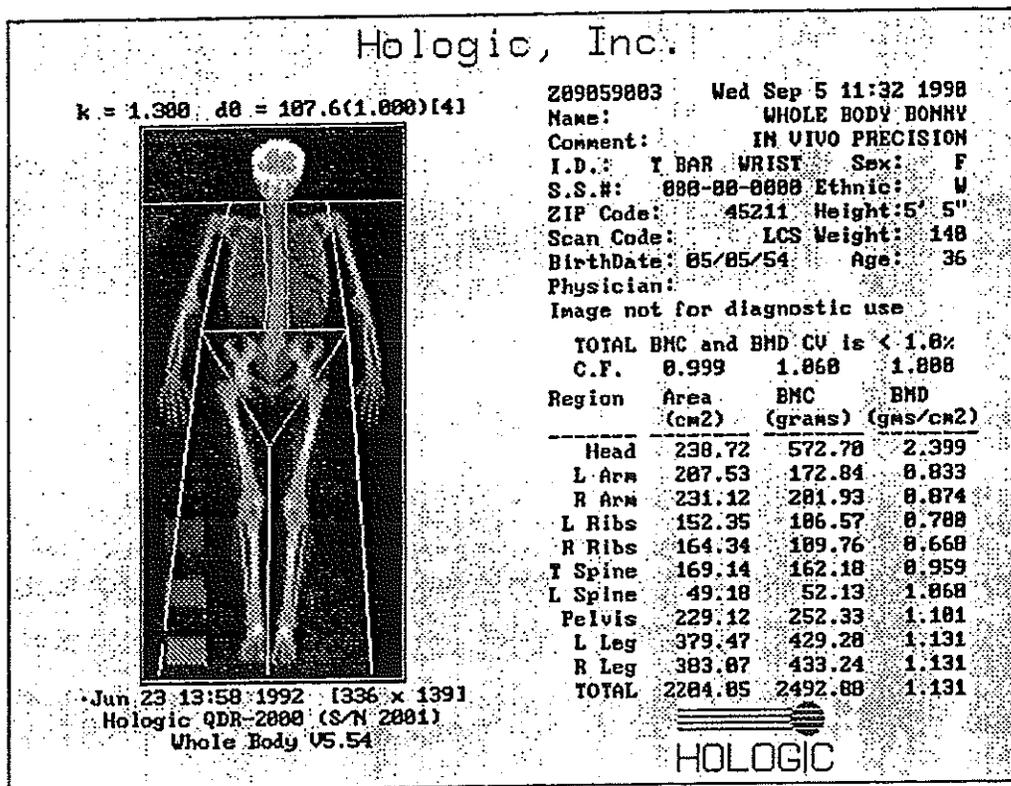The first soft tissue report appears for printing.

Figure 5-12. BMC Report

First Soft Tissue Report

This report includes:

- the image
- fat content in grams
- grams of lean including BMC
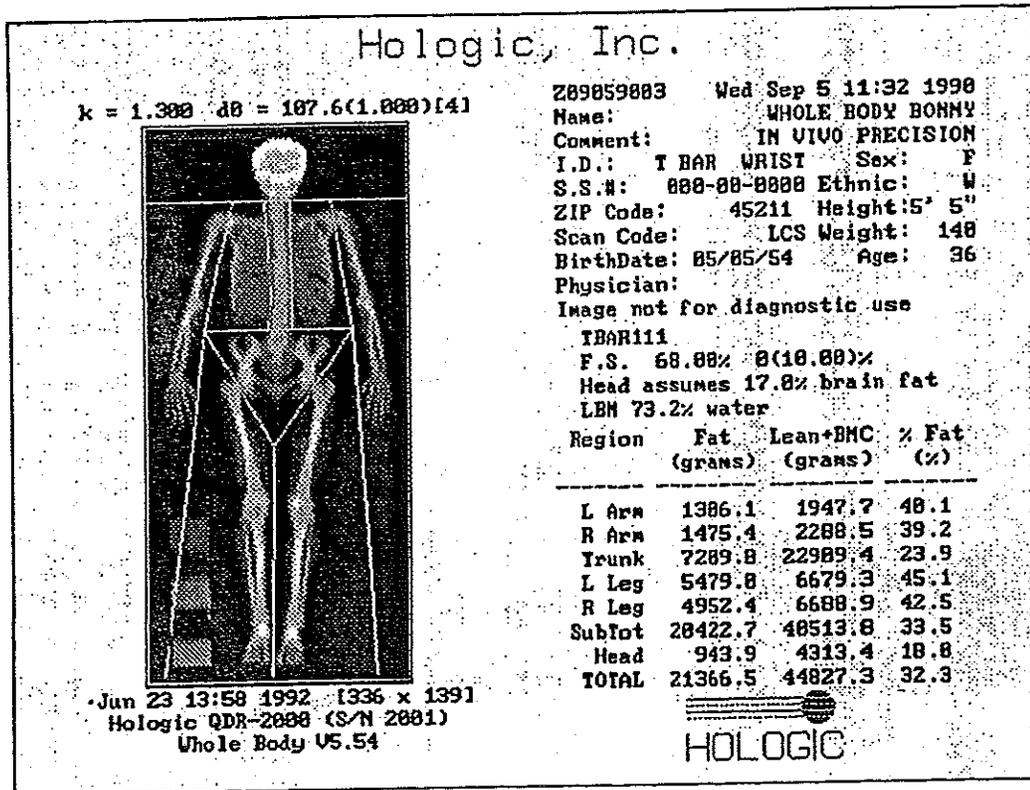- % of fat.

Figure 5-13. First Soft Tissue Report

This is report for the arms, trunk, legs, subtotal, head, and total body.

> **Note:** If a result for human soft tissue is reported with
> ***** and a %Fat in ( ), contact Hologic. No human
> subject should have these results since it indicates a
> tissue composition that is leaner than pure protein or
> fattier than pure fat.

Second Soft Tissue Report

To access the second soft tissue report, press <PgDn>.

The second soft tissue report then appears for printing.


```
                    Hologic, Inc.

                              Z89059003    Wed Sep 5 11:32 1998
                              Name:              WHOLE BODY BONNY
       Hologic QDR-2888 (S/N 2881)    Comment:            IN VIVO PRECISION
           Whole Body V5.54           I.D.:    T BAR WRIST   Sex:    F
          Jun 23 13:58 1992           S.S.#:   888-88-8888 Ethnic:   W
                                      ZIP Code:      45211  Height:5' 5"
                                      Scan Code:        LCS Weight:  148
       TBAR111                        BirthDate: 85/85/54     Age:   36
       F.S. 68.88% 8(18.88)%          Physician:

       Region   BMC      Fat     Lean      Lean+BMC   Total     % Fat
               (grams)  (grams) (grams)   (grams)    (grams)    (%)
               -------  ------- -------   --------   -------    ----
       L Arm    172.8   1386.1  1774.9    1947.7     3253.8     40.1
       R Arm    281.9   1475.4  2886.5    2288.5     3763.9     39.2
       Trunk    683.8   7289.8  22226.4   22989.4    38119.3    23.9
       L Leg    429.2   5479.8  6258.1    6679.3     12158.2    45.1
       R Leg    433.2   4952.4  6255.7    6688.9     11641.3    42.5
       SubTot   1928.2  28422.7 38593.6   40513.8    68936.5    33.5
       ~Head    572.7   943.9   3748.7    4313.4     5257.3     18.8
       TOTAL    2492.9  21366.5 42334.4   44827.3    66193.8    32.3

       ~assumes 17.8% brain fat
       LBM 73.2% water

                              HOLOGIC
```

Figure 5-14. Second Soft Tissue Report

This report includes:

• BMC in grams
• grams of fat
• grams of lean including BMC
• Total body grams
• % of Fat.

This is reported for the arms, trunk, legs, Subtotal, Head and Total body.

Note: Pressing <PgUp> reverses the order of the reports.

The procedure for comparison of two whole body tissue scans is identical to the procedures described in *Compare* in this section.

As indicated on the tissue report, the body composition software assumes that the lean body mass of the subject being measured is 73.2% water.[2] The tissue results are not overly sensitive to this assumption. For example, if a subject differs from the assumed value by 2%, then the reported lean body mass differs only 0.17% from the expected value.

For body composition analysis by Dual Energy X-Ray Absorptionmetry (DXA), water has some fat compared to lean tissue. The assumption is that water is 8.6% fat. Therefore, if a patient gains or loses large amounts of water, 91.4% of the gain/loss is evident in the water and 8.6% in the fat component.

Before using the analysis software to evaluate body composition of objects whose lean body mass is significantly different from this assumption, contact Hologic Product Application Specialists.
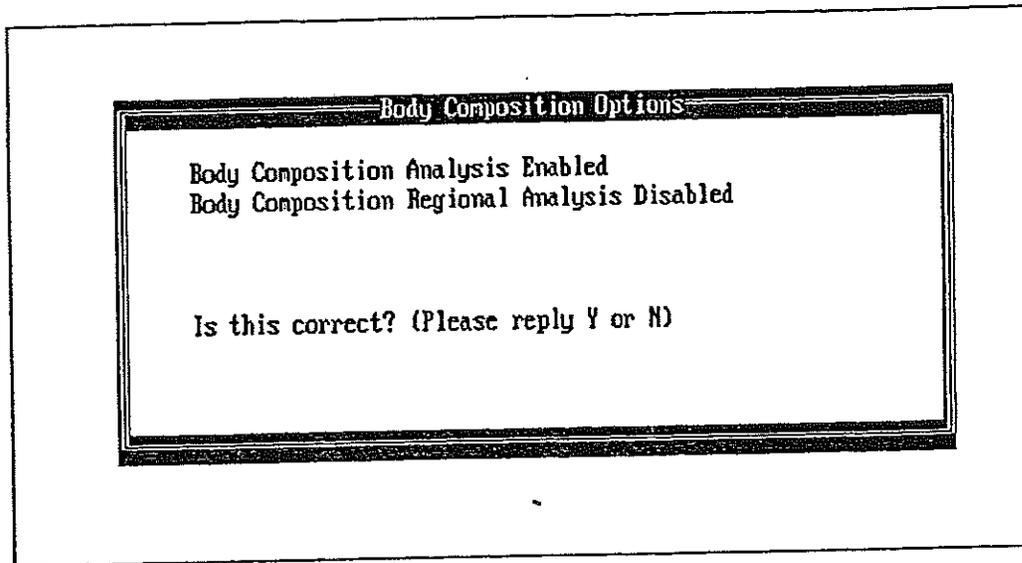
Whole Body Default Analysis

When Body Composition Analysis is installed, the default analysis includes tissue composition. In some cases, you may only want an analysis for calcium content. To change the default, change the Body Composition Options using **Wbtissue.**

Wbtissue appears on the Utility Menu.

---

[2]Pace B, Rathburn E.N. Studies on body composition III The body water and chemically combined nitrogen content in relation to fat content. J Biol Chem 1945; 158:685-91

Once you choose **Wbtissue**, the Body Composition Options screen displays the default options:

```
╔═════════════Body Composition Options═════════════╗
║                                                   ║
║    Body Composition Analysis Enabled              ║
║    Body Composition Regional Analysis Disabled    ║
║                                                   ║
║                                                   ║
║    Is this correct? (Please reply Y or N)         ║
║                                                   ║
║                                                   ║
╚═══════════════════════════════════════════════════╝
```

To change the default settings, answer N to the prompt and follow the directions on successive screens. The new default settings will apply to all future whole body scan analyses.

Body Composition Regional Analysis is a special research mode that should remain disabled.