

# **Welcome to a quick tour of Limb Volumes Professional 5.0**

Limb Volumes Professional was developed by therapists for therapists. It has been evaluated in the field and has received rave reviews for ease of use, accuracy, flexibility and for its utility in patient reporting and documentation use. Its utility has further been demonstrated by its use in lymphedema clinical and research studies with scientific presentations at international meetings LVP5.0 is the latest version and is the only automated limb volumes software that allows you to:

- *choose any segment length for upper or lower limb automatic volume determinations*
- *choose either uniform segment lengths or variable nonuniform segment lengths*
- *choose additionally to compare proximal and distal limb volumes with graphics*
- *include methods and algorithms for hand and foot volumes that are based on scientifically validated and published procedures with the option to include these in overall limb volumes*
- *immediately view graphical displays of limb segment-by-segment comparisons*
- *provide valid tabulated and graphic summary reports of volumes and edema for documentation.*
- *provide all patient data and information, and sequential changes, within a self-contained file*
- *provide options to determine and report body mass index and body surface area*
- *obtain unlimited technical and applications support*

Please review the following sequence of slides made from screen shots that show some of the main features and procedural steps in more detail

You can download a fully functional free trial version and obtain further instructional and other materials by visiting  
[www.limbvolumes.org](http://www.limbvolumes.org)

If you have any questions you may contact us at  
[support@limbvolumes.org](mailto:support@limbvolumes.org)

# LIMB VOLUME CALCULATION, TRACKING & DOCUMENTATION

## Limb Volumes Professional Version 5.0

*A clinical innovation from BIMECO/Bioscience Research Institute*

This is a fully functional single machine license version of Limb Volumes Professional 5.0.

Educational and Tutorial information covering all aspects of program operation and measurement methods (limb, hand and foot) are available for downloading at:

<http://www.bioscience-research.net/EducationAndReference.html>

LVP5.0 helps you to easily and systematically calculate, track, document and report your patients' limb volumes during the course of therapy. There are many new features in 5.0!

1. Arm or Leg volumes with unilateral or bilateral involvement now includes options for any segment length - uniform lengths or variable lengths between measurement sites!
2. The option to additionally determine, track and graph both proximal and distal volumes
3. Edema volume and percentage edema of affected limbs (unilateral involvement)
4. Option to include HAND volumes as part of total upper extremity assessment using either circumference OR width and depth measurements
5. Option to include FOOT volumes as part of total lower extremity assessment using a new and scientifically validated algorithm
6. Automatic calculation and reporting of body mass index (BMI) and surface area (BSA)

For each patient visit that you measure limb size, simply enter the limb measurements and let the software calculate limb volumes and display the needed comparisons graphically to provide an image of how well treatment is progressing. You can name, save, print and recall self-contained patient records as with any Excel file

View

Full Screen

Reset Screen

*This is the HELLO page.  
When ever you run LVP5.0  
It will open to this page*

*Click here  
to begin*

Click Here to  
BEGIN

Serial Number LVP12345678 ←

To register, purchase or convert to a permanent version go to: <http://limbvolumes.org>

DL0608

For information [support@limbvolumes.org](mailto:support@limbvolumes.org)

Copyright 2008 BIMECO/BSRI

*After you install the software a  
serial number is generated.  
Use the unique serial number to  
register to receive your  
permanent activation code.*

After clicking the **BEGIN** tab on the **HELLO** page This **INTRO** page will be displayed  
For 1<sup>st</sup> visits select the **Patient Data Page** Otherwise choose the appropriate action

1. If this is your **INITIAL** session with this patient then begin by entering patient information in patient data page -----> **Patient Data Page**

View

Full Screen

Reset Screen

If this is the patient's 1<sup>st</sup> visit then click here

2. If this is a **FOLLOW-UP** visit, patient's initial data has already been entered.

### Current Selections

Patient	Fake Patient	123456
Limb	Upper Extremity	Unilateral
Options	Hand Included	
Method	CIRCUMFERENCE Method - NOW ACTIVE	
Affected	Affected limb is designated as TX LIMB	

For other visits  
select visit number or  
use **Foot** or **Hand** tabs  
If these options active

### Options

If **UPPER EXTREMITY**, and you want to include **HAND** volumes, then go to **HANDC**

HANDC

If **LOWER EXTREMITY** and you want to include **FOOT** volumes, then go to **FOOTC**

FOOTC

OTHERWISE, proceed to the desired visit (**V1-V24**) by selecting it using the list below

PAGES

HELLO

INTRO

PATIENT

START

SUMMARY

GRAPHS

<input checked="" type="radio"/> V1	<input type="radio"/> V2	<input type="radio"/> V3	<input type="radio"/> V4	<input type="radio"/> V5	<input type="radio"/> V6	<input type="radio"/> V7	<input type="radio"/> V8	<input type="radio"/> V9	<input type="radio"/> V10	<input type="radio"/> V11	<input type="radio"/> V12
<input type="radio"/> V13	<input type="radio"/> V14	<input type="radio"/> V15	<input type="radio"/> V16	<input type="radio"/> V17	<input type="radio"/> V18	<input type="radio"/> V19	<input type="radio"/> V20	<input type="radio"/> V21	<input type="radio"/> V22	<input type="radio"/> V23	<input type="radio"/> V24

Select  
Visit  
Number

# PATIENT Page is Setup at First Visit

<b>Patient's Name? Last First</b> Fake Patient	<b>Patient's ID?</b> 123456	<b>Unilateral or Bilateral?</b> <input checked="" type="radio"/> Unilateral <input type="radio"/> Bilateral	<b>Upper or Lower Extremity</b> <input checked="" type="radio"/> Upper Extremity <input type="radio"/> Lower Extremity	PAGES <input type="radio"/> HELLO <input type="radio"/> INTRO <input checked="" type="radio"/> PATIENT <input type="radio"/> START <input type="radio"/> SUMMARY	
<b>1. Type patient name and ID above and designate affected limb(s) as unilateral/bilateral and upper/lower extremity</b>		<b>2. Since this is an UPPER extremity you have the option to include HAND volumes</b> Built in algorithms estimate hand volumes and automatically add it to arm volumes. To activate the hand volume option select 'Include Hand ' from the options list			
<b>Information needed</b> 1. Patient's name and ID (optional) 2. Unilateral or bilateral involvement 3. Upper or lower extremity		If Lower Extremity: Include foot? If Upper Extremity: Include hand? If include – Hand method? If Unilateral: Affected limb?		<b>Hand Method</b> <input checked="" type="radio"/> Width-Depth Method <input type="radio"/> Circumference Method	
<b>3. If unilateral, select designation for AFFECTED limb as Right, Left or Tx using the option list</b>			<b>Affected Limb Designation</b> <input checked="" type="radio"/> Right <input type="radio"/> Left <input type="radio"/> Tx	<input type="button" value="Full Screen"/> <input type="button" value="Reset Screen"/>	
<input checked="" type="radio"/> V1 <input type="radio"/> V2 <input type="radio"/> V3 <input type="radio"/> V4 <input type="radio"/> V5 <input type="radio"/> V6 <input type="radio"/> V7 <input type="radio"/> V8 <input type="radio"/> V9 <input type="radio"/> V10 <input type="radio"/> V11 <input type="radio"/> V12 <input type="radio"/> V13 <input type="radio"/> V14 <input type="radio"/> V15 <input type="radio"/> V16 <input type="radio"/> V17 <input type="radio"/> V18 <input type="radio"/> V19 <input type="radio"/> V20 <input type="radio"/> V21 <input type="radio"/> V22 <input type="radio"/> V23 <input type="radio"/> V24					
Include BMI and BSA? <input checked="" type="radio"/> Yes <input type="radio"/> No		<b>CURRENT SELECTION SUMMARY</b> Limb <b>Upper Extremity</b> <b>Unilateral</b> Options <b>BMI and BSA Calculation Active</b> Method Affected <b>Right</b>			<div style="border: 2px solid yellow; padding: 10px; width: fit-content; margin: 0 auto;"> <b>LAST STEP</b>                      Click here to                      Enter Limb Lengths                 </div>

**After entering info and selecting options click the last step button to go to START**

# PATIENT Page with HAND option active

<b>Patient's Name? Last First</b> Fake Patient	<b>Patient's ID?</b> 123456	<b>Unilateral or Bilateral?</b> <input checked="" type="radio"/> Unilateral <input type="radio"/> Bilateral	<b>Upper or Lower Extremity</b> <input checked="" type="radio"/> Upper Extremity <input type="radio"/> Lower Extremity	PAGES <input type="radio"/> HELLO <input type="radio"/> INTRO <input checked="" type="radio"/> PATIENT <input type="radio"/> START <input type="radio"/> SUMMARY  <input type="button" value="Full Screen"/> <input type="button" value="Reset Screen"/>																								
<b>1. Type patient name and ID above and designate affected limb(s) as unilateral/bilateral and upper/lower extremity</b>		<b>2. Since this is an UPPER extremity you have the option to include HAND volumes</b> Built in algorithms estimate hand volumes and automatically add it to arm volumes. To activate the hand volume option select 'Include Hand ' from the options list																										
<b>Hand Volume Option is Active</b> Hand volumes can be measured either by circumferences or using width and depth Once you select a method for a given patient you should continue with it for all visits Select the hand volume method for this patient via the hand method options list		<b>Hand Method</b> <input checked="" type="radio"/> Include Hand <input type="radio"/> Include Foot <input type="radio"/> Exclude Hand <input checked="" type="radio"/> Exclude Foot  <input checked="" type="radio"/> Width-Depth Method <input type="radio"/> Circumference Method																										
<b>3. If unilateral, select designation for AFFECTED limb as Right, Left or Tx using the option list</b>		<b>Affected Limb Designation</b> <input checked="" type="radio"/> Right <input type="radio"/> Left <input type="radio"/> Tx																										
<table style="width: 100%; text-align: center;"> <tr> <td><input checked="" type="radio"/> V1</td><td><input type="radio"/> V2</td><td><input type="radio"/> V3</td><td><input type="radio"/> V4</td><td><input type="radio"/> V5</td><td><input type="radio"/> V6</td><td><input type="radio"/> V7</td><td><input type="radio"/> V8</td><td><input type="radio"/> V9</td><td><input type="radio"/> V10</td><td><input type="radio"/> V11</td><td><input type="radio"/> V12</td> </tr> <tr> <td><input type="radio"/> V13</td><td><input type="radio"/> V14</td><td><input type="radio"/> V15</td><td><input type="radio"/> V16</td><td><input type="radio"/> V17</td><td><input type="radio"/> V18</td><td><input type="radio"/> V19</td><td><input type="radio"/> V20</td><td><input type="radio"/> V21</td><td><input type="radio"/> V22</td><td><input type="radio"/> V23</td><td><input type="radio"/> V24</td> </tr> </table>				<input checked="" type="radio"/> V1	<input type="radio"/> V2	<input type="radio"/> V3	<input type="radio"/> V4	<input type="radio"/> V5	<input type="radio"/> V6	<input type="radio"/> V7	<input type="radio"/> V8	<input type="radio"/> V9	<input type="radio"/> V10	<input type="radio"/> V11	<input type="radio"/> V12	<input type="radio"/> V13	<input type="radio"/> V14	<input type="radio"/> V15	<input type="radio"/> V16	<input type="radio"/> V17	<input type="radio"/> V18	<input type="radio"/> V19	<input type="radio"/> V20	<input type="radio"/> V21	<input type="radio"/> V22	<input type="radio"/> V23	<input type="radio"/> V24	You can choose either width-depth or Circumference methods. Here the Width-depth method is selected.
<input checked="" type="radio"/> V1	<input type="radio"/> V2	<input type="radio"/> V3	<input type="radio"/> V4	<input type="radio"/> V5	<input type="radio"/> V6	<input type="radio"/> V7	<input type="radio"/> V8	<input type="radio"/> V9	<input type="radio"/> V10	<input type="radio"/> V11	<input type="radio"/> V12																	
<input type="radio"/> V13	<input type="radio"/> V14	<input type="radio"/> V15	<input type="radio"/> V16	<input type="radio"/> V17	<input type="radio"/> V18	<input type="radio"/> V19	<input type="radio"/> V20	<input type="radio"/> V21	<input type="radio"/> V22	<input type="radio"/> V23	<input type="radio"/> V24																	
Include BMI and BSA? <input checked="" type="radio"/> Yes <input type="radio"/> No		<b>CURRENT SELECTION SUMMARY</b> Limb Upper Extremity    Unilateral Options Hand Included    BMI and BSA Calculation Active Method WIDTH and DEPTH Method - NOW ACTIVE Affected Right		LAST STEP Click here to Enter Limb Lengths 																								

**After entering info and selecting options click the last step button to go to START**

# START page is where limb lengths and segment lengths are specified

This page is shown setup for an arm length of 44 cm and a fixed segment length of 4 cm. Since the hand option is active the measured hand length is entered as 18 cm and a hand segment of 3 cm is selected.

Patient's name	Patient's ID	Limb Designation and Option
Fake Patient	123456	Upper Extremity - Unilateral Hand Included

	Limb Length
1. LIMB LENGTH: Enter distance from wrist to upper-most point on arm that you will measure circumferences -->	44 cm

	Seg Length
2. SEGMENT LENGTH: For fixed segment lengths choose distance between adjacent circumference measures. Default is 4 cm but you can choose any segment length. To accept default do nothing else enter a new value -->	4 cm

Fixed Segment Lengths (Automatic)     Variable Segment Lengths (Manual)

Select the variable length option if you want to use nonuniform spacing between adjacent circumferences

	Hand Length
3. HAND LENGTH: Since hand option is chosen, enter the distance from the middle finger nailfold to the wrist -->	18 cm

	Seg Length
4. HAND SEGMENTS: Choose the fixed interval at which you will make hand measurements. Normaly these are at a seperation of 3 cm. To accept default do nothig else enter new value ----->	3 cm

BMI and BSA calculation option is active. Enter patient height and weight			
Height (inches)	Weight (lbs)	BMI (kg/m2)	BSA (m2)
62	138	25.3	1.63

LAST STEP -----> **5. Click HERE to Enter HAND Measurements for Visit 1**

With HAND option active clicking here sends you to the hand data entry page



# PATIENT page with FOOT option active

<b>Patient's Name? Last First</b> Fake Patient	<b>Patient's ID?</b> 123456	<b>Unilateral or Bilateral?</b> <input type="radio"/> Unilateral <input checked="" type="radio"/> Bilateral	<b>Upper or Lower Extremity</b> <input type="radio"/> Upper Extremity <input checked="" type="radio"/> Lower Extremity
<b>1. Type patient name and ID above and designate affected limb(s) as unilateral/bilateral and upper/lower extremity</b>		<b>2. Since this is a LOWER extremity, you have the option to include FOOT volumes</b> A built in algorithm calculates foot volumes and automatically adds it to leg volumes To activate the foot volume option select 'Include Foot' from the options	
<b>Foot Volume is Active ...Select limb designation (if unilateral) and go to LAST STEP</b>		<b>Hand Method</b> <input checked="" type="radio"/> Width-Depth Method <input type="radio"/> Circumference Method	
(Empty space for patient data)		<b>Affected Limb Designation</b> <input checked="" type="radio"/> Right <input type="radio"/> Left <input type="radio"/> Tx	
V1 V2 V3 V4 V5 V6 V7 V8 V9 V10 V11 V12 V13 V14 V15 V16 V17 V18 V19 V20 V21 V22 V23 V24			
Include BMI and BSA? <input checked="" type="radio"/> Yes <input type="radio"/> No	<b>CURRENT SELECTION SUMMARY</b> Limb Lower Extremity    Bilateral Options Foot Included    BMI and BSA Calculation Active Method Affected Right		

LAST STEP  
 Click here to Enter Limb Lengths

PAGES  
 HELLO  
 INTRO  
 PATIENT  
 START  
 SUMMARY

**After entering info and selecting options click the last step button to go to START**

# START page is where limb lengths and segment lengths are specified

This page is shown setup for a leg length of 72 cm and a fixed segment length of 4 cm. Since the foot option is active, the foot data can be entered by clicking on the 'Go To FootC' button at the page bottom.

Patient's name	Patient's ID	Limb Designation and Option	
Fake Patient	123456	Lower Extremity - Unilateral Foot Included	

1. LIMB LENGTH: Enter distance from ankle to upper-most point on leg that you will measure circumferences	Limb Length	72	cm
2. SEGMENT LENGTH: For fixed segment lengths choose distance between adjacent circumference measures. Default is 4 cm but you can choose any segment length. To accept default do nothing else enter a new value --->	Seg Length	4	cm
<input checked="" type="radio"/> Fixed Segment Lengths (Automatic) <input type="radio"/> Variable Segment Lengths (Manual)			
Select the variable length option if you want to use nonuniform spacing between adjacent circumferences			
3. FOOT VOLUME OPTION ACTIVE: Click button below for Foot Data Entry Form (FOOTC)	Hand Length		cm
	Seg Length	3	cm

BMI and BSA calculation option is active. Enter patient height and weight			
Height (inches)	Weight (lbs)	BMI (kg/m <sup>2</sup> )	BSA (m <sup>2</sup> )
62	138	25.3	1.63

**LAST STEP: Click to go to Foot Data Entry Form ----->**
Go To FootC

You can enter leg circumferences after entering foot measurements

# FOOT volume data entry page

Smith Mary

Enter visit number for which you want to determine the foot volumes (Current Visit) in the blue box below

Enter Visit Number --->

1

Get Foot Image

This Worksheet is used to enter data for the calculation of FOOT volumes

Enter all measurement data in millimeters (mm) in yellow cells

1. Measurements are entered in the two yellow columns as defined by the figure.

Validating and other information may be found in the literature.

Lymphology 2005;38(1):20-27  
Foot volume estimates based on a geometric algorithm in comparison to water displacement.

	Right Foot	Left Foot
Ly	50.00	50.00
Lxy	110.00	110.00
Wx	120.00	100.00
Wz	105.00	95.00
Wy	90.00	80.00
L12	80.00	80.00
L8	80.00	80.00
W12	75.00	75.00
W8	70.00	60.00
W4	45.00	35.00
Hx	110.00	80.00
Hz	90.00	60.00
Hy	60.00	35.00

Ly

50.00

50.00

Lxy

110.00

110.00

Wx

120.00

100.00

Wz

105.00

95.00

Wy

90.00

80.00

L12

80.00

80.00

L8

80.00

80.00

W12

75.00

75.00

W8

70.00

60.00

W4

45.00

35.00

Hx

110.00

80.00

Hz

90.00

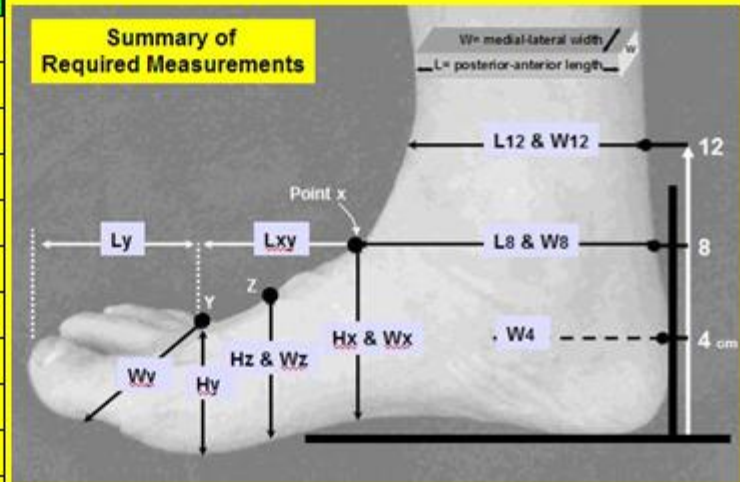
60.00

Hy

60.00

35.00

Summary of Required Measurements



Detailed instructions for foot measurement with the following link

<http://bioscience-research.net/lymphedema.html>

After data entry remove foot image ONLY if it is visible THEN press button to transfer data to FOOT form

2. After data entry click here to store foot volumes

Transfer Data to FOOT

Remove Foot Image

When the Foot Volumes option is selected the foot volumes are added to the leg volumes to yield total lower extremity volume.

# Limb Circumferences and Volume Determinations

For each visit volumes are automatically calculated.

For unilateral cases, edema volume and percent edema are immediately available.

Visit 1								Full Screen		Reset Screen	
Affected Limb	Limb Length	Segment Length (cm)		Total # Segments		Right		Left			
Right Limb	44	4		11		Proximal	Distal	Proximal	Distal		
From data there are	11	full segments plus one partial segment of length =		0	11	1397	1285	1117	658		
Enter Circumferences in yellow cells below											
Note that the first circumference pair to be entered for "0" cm corresponds to either the wrist or ankle											
cm from wrist or ankle	Circumferences (cm)		segment number	Volume (ml)							
	Right	Left		Right	Left						
0	19	14.6									
4	21.8	14	1	133	65						
8	24	16	2	167	72						
12	26.8	18.8	3	206	97						
16	29	21	4	248	126						
20	29	21.8	5	268	146						
24	28.5	22	6	263	153						
28	30.5	24.5	7	277	172						
32	30	25.5	8	291	199						
36	29	27.5	9	277	224						
40	29.4	28.5	10	272	250						
44	29.9	30	11	280	273						

Limb Volumes	Right	Left	Edema	%Edema
Total Volume (ml)	3041	2135	906	42.4
Limb only (ml)	2682	1776		
Hand only (ml)	359	359		

**Segmental Volumes (cm<sup>3</sup>)**

Segmental volumes are shown numerically and graphically

Graphics allow immediate comparisons

1. Enter circumferences into yellow columns and volumes are automatically determined!

Click here to use Visit 1 non-affected limb circumference values as reference

CAUTION! Visit 1 values will override non-affected limb values you may have already entered on other visits

2. Click here to optionally choose to compare proximal and distal volumes using any breakpoint between proximal and distal volumes. In this example distal includes segments 1 through 6.

Therapist **Mary Jones**

Pt. Name **Fake Patient**  
 ID **123456**

Date **7-May-08**  
 Tx number **1**

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# Summary Report

Unilateral Upper Extremity

BMI=25.3kg/m2

BSA=1.63 m2

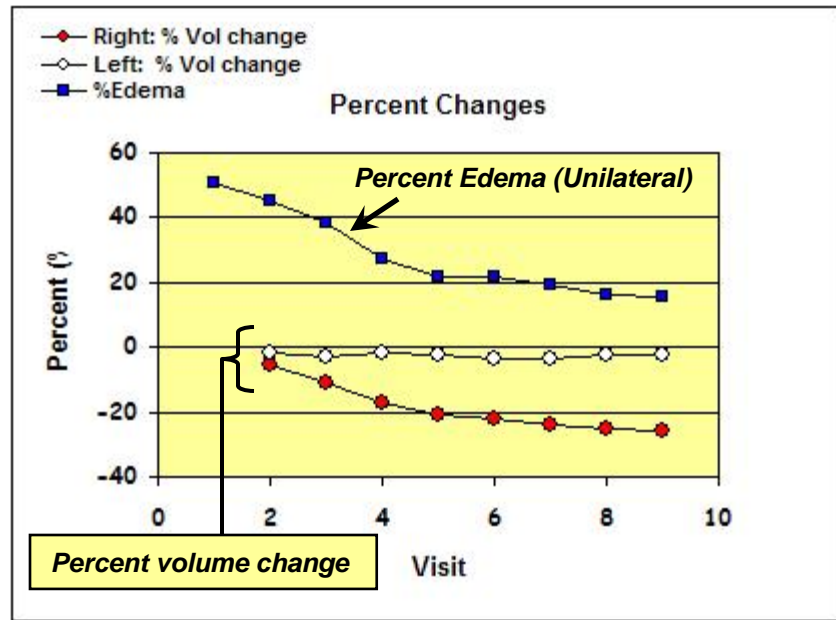
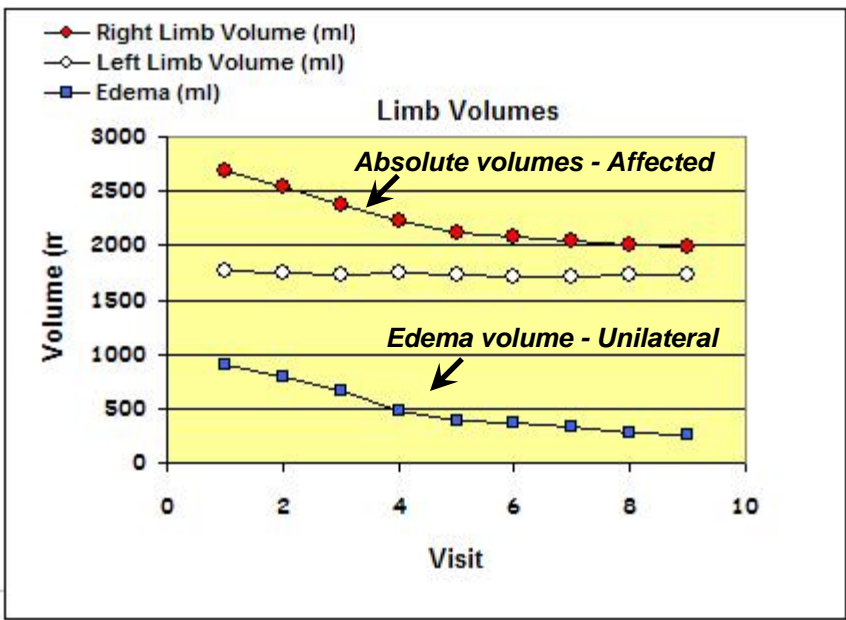
Fake Patient

123456

6/2/2008 10:56

Visit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Right Limb Volume (ml)	2682	2542	2382	2228	2117	2082	2043	2012	1995	0															0
Left Limb Volume (ml)	1776	1748	1722	1747	1738	1714	1714	1731	1731	0															0
Edema (ml)	906.3	794	659.2	481	380	368	328	282	265																
%Edema	51	45	38	28	22	21	19	16	15																
Right: % Vol change		-5.2	-11.2	-16.9	-21.1	-22.4	-23.8	-25.0	-25.6																
Left: % Vol change		-1.5	-3.0	-1.6	-2.1	-3.5	-3.5	-2.5	-2.5																

*All important parameters are tabulated sequentially and graphed for easy viewing and review of patient progress. The page can be printed and used directly as a report.*



Note: In the above graphics, Visit refers to patient visits during which limb volume measurements were made and recorded

The AFFECTED Limb(s) of this patient is **Right Limb**

Double click on COMMENTS to enter or edit your comments

COMMENTS: Right mastectomy June 2002 with 12 nodes removed. Swelling started January 2007. Sought treatment July 2007. Treated 3x/wk for three weeks.

Therapist /Evaluator \_\_\_\_\_ Date \_\_\_\_\_ Physician \_\_\_\_\_

# Proximal – Distal Volumes Comparison Summary

Unilateral Lower Extremity BMI=25.3

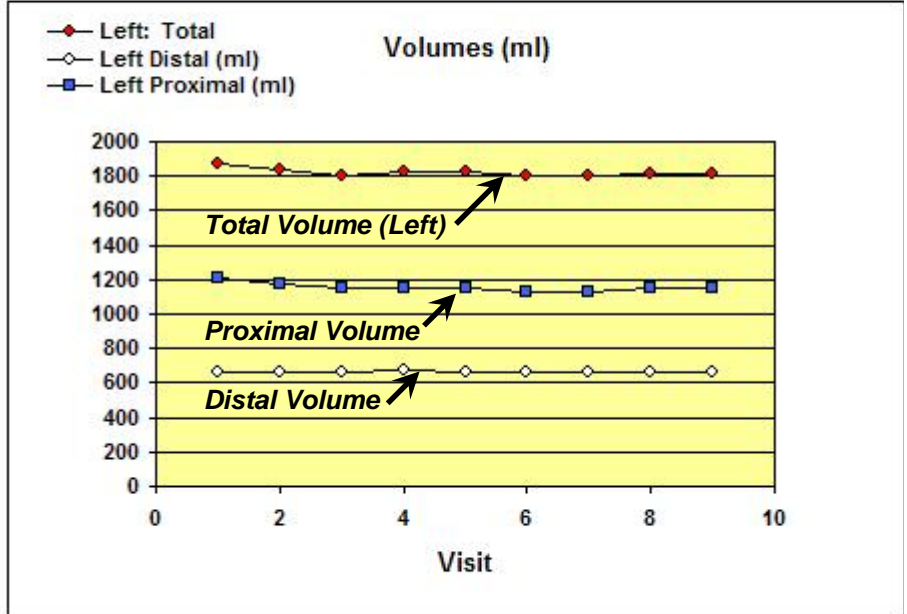
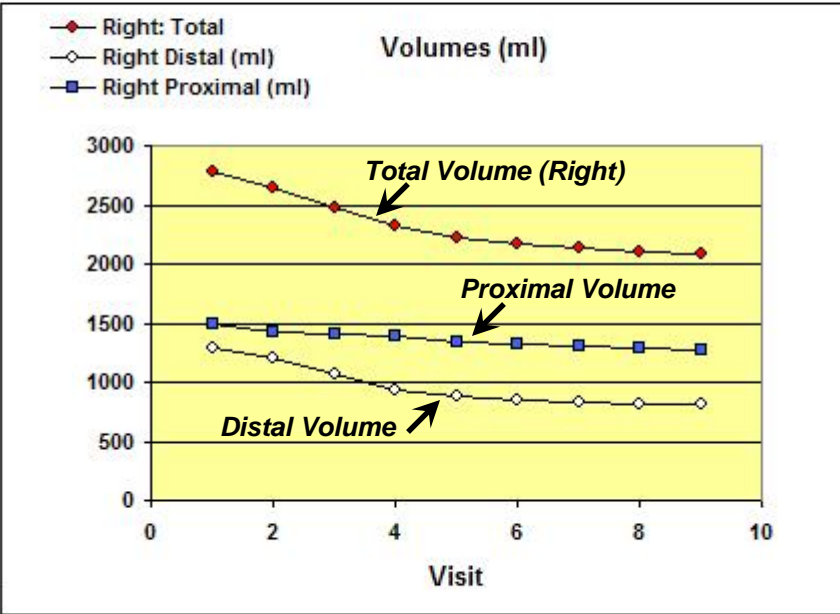
6/4/2008 22:05

Fake Patient

123456

Visit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
<b>Right Proximal (ml)</b>	1492	1431	1413	1395	1336	1322	1303	1285	1277	0	0														0
<b>Right Distal (ml)</b>	1285	1206	1063	928	877	850	829	816	808	0	0														0
<b>Left Proximal (ml)</b>	1213	1173	1147	1155	1155	1130	1130	1146	1146	0	0														0
<b>Left Distal (ml)</b>	658	658	658	675	666	668	668	668	668	0	0														0
<b>Right: Total</b>	2777	2637	2476	2323	2212	2172	2132	2101	2085	0	0														0
<b>Left: Total</b>	1871	1832	1806	1830	1821	1797	1797	1814	1814	0	0														0

*Right and Left limb proximal and distal volumes can be sequentially assessed and compared to the changes in total limb volume. This facilitates assessment of therapy over time.*



Note: In the above graphics, Visit refers to patient visits during which limb volume measurements were made and recorded

The AFFECTED Limb(s) of this patient is **Right Limb**

**COMMENTS:** Right mastectomy June 2002 with 12 nodes removed. Swelling started January 2007. Sought treatment July 2007. Treated 3x/wk for three weeks.

Therapist /Evaluator \_\_\_\_\_ Date \_\_\_\_\_ Physician \_\_\_\_\_