

Limb Measurement Procedures Illustrated

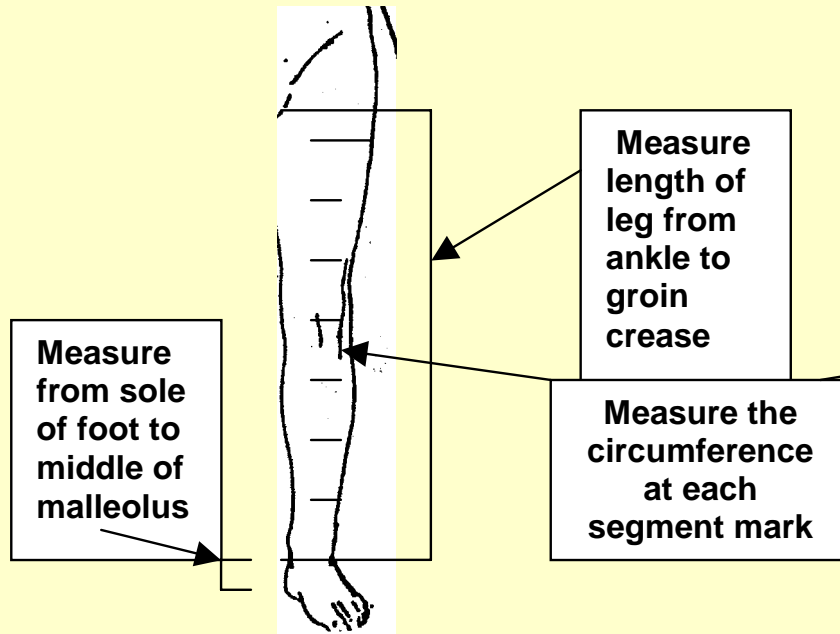
**Presented by
BIMECO - BSRI**

support@limbvolumes.org

Measuring Protocol For Limb Volumes: Summary

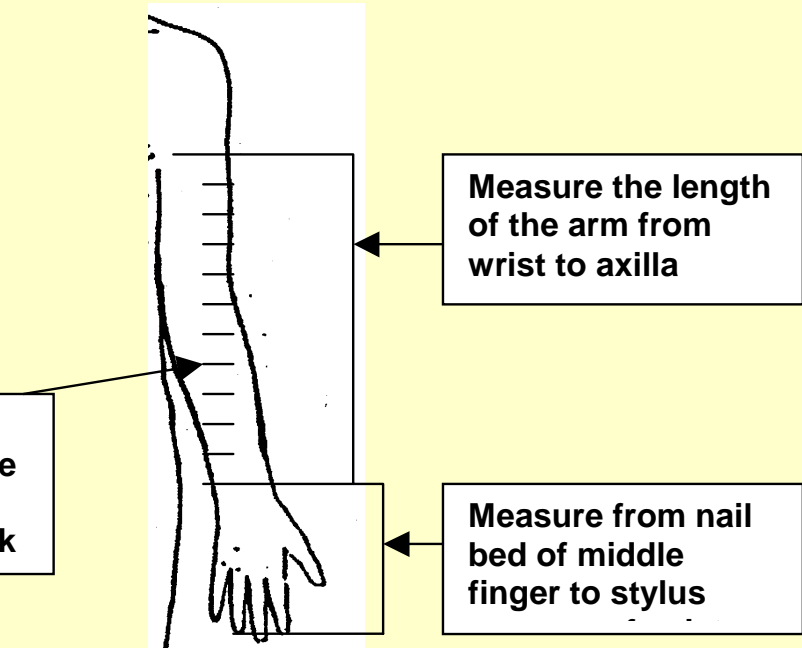
Arm

1. Client supine with arm at side.
2. Measuring board or tape measure on flat surface.
3. Measure from nail bed of middle finger and mark zero point at styloid processes of wrist and record on the form.
4. Measure length of limb from wrist to axillary crease and record on form. Place a card of stiff paper at the axilla and putting the arm against the side, the top of the card then determines the level of the axillary measurement. Record limb length on the form.
5. Decide what segment length you would like. (4 cm, 6cm, 10 cm etc. the program will calculate volumes for any selected segment length). Record the chosen segment length on the form.
6. Mark the arm at the chosen segment lengths starting at the wrist.
7. Measure circumferences at each mark including the final length mark at the axillary crease and enter on form.

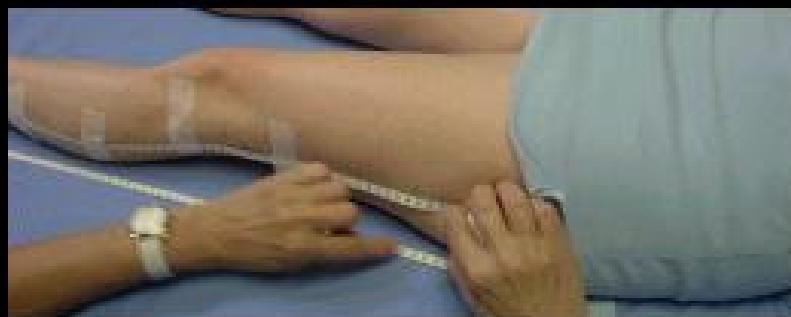


Leg

1. Client supine.
2. Measuring board or tape measure on flat surface.
3. Measure from sole of foot and mark zero point at middle of lateral malleolus of ankle and record on the form.
4. Measure length of limb from ankle to groin crease and record on form. Place a card of stiff paper at the groin. The top of the card then determines the level of the groin measurement. Record limb length on the form.
5. Decide what segment length you would like. (4 cm, 6cm, 10 cm etc. the program will calculate volumes for any selected segment length). Record the chosen segment length on the form.
6. Mark the leg at the chosen segment lengths starting at the ankle.
7. Measure circumferences at each mark including the final length mark at the groin crease and enter on form.



STEP 1 PREPARATION



- You will need a measuring board or tape marked with centimeters on a flat surface, a washable marking pen, and a tape measure. Tape measures with a spring attachment (Gulik) help keep tape measure tension consistent.
- Position the patient in a supine position on a firm, flat surface. The arm should be relaxed with a slight bend to the elbow. The ankle should be flexed 90°.
- It is important to keep the board or tape on the flat surface while marking the intervals to be measured. Holding the tape against the limb will result in inaccurate follow-up measurements. Following the curve of this normal leg resulted in a 2-centimeter difference. On an edematous limb, this discrepancy will be even greater. When repeating measurements, the interval marks will be at a different level.

STEP 2 THE STARTING POINT



Measure and record the distance from the nail bed of the middle finger to styloid process of the wrist, or from the sole of the foot to the middle of the lateral malleolus. Remember to keep the ankle flexed.

This is the starting point for your circumferential measurements.

STEP 3 LIMB LENGTH



The highest arm measurement is at the axillary crease. Placing a stiff paper at the axilla and putting the arm against the side determines this level. A similar procedure is done at the groin. Any circumference higher than this will be at an angle and will be inaccurate.

STEP 4 MARKING INTERVALS



From the starting point, measure the desired intervals for circumferential measurements and mark with a washable marker. (White-Out can be used on very dark skin)

STEP 5 MEASURING



Measure circumferences at marked intervals and record. Keep tape at a right angle to the length of the limb. Overlap the tape with the interval mark in the middle. Firm tension is applied to the tape. There may be a slight indentation of loose skin. A spring attachment keeps tension consistent.

Step 6: Enter Limb Circumferences in Limb Volumes Professional

Enter data in yellow cells			Notes: Tx is affected limb undergoing treatment; Norm is contralateral limb for comparison					For each visit limb volumes & %edema are immediately available for review ↓ ↓ ↓				
Visit 1	Limb Length	50	If both limbs are affected (bilateral) then limbs are designated as right and left		Segment Length (cm)	4	Total # Segments					
	2				13							
From data there are	12		full segments plus one partial segment of length =									
Enter circumferences measured from wrist or ankle into columns B and C												
cm from wrist/ankle	cm to the wrist or ankle measured from the middle finger nail bed or sole of foot											
Circumferences (cm)			segment number	Volume (cm ³)		Area (cm ²)		Total Limb values	Tx	Norm	Edema	%Edema
								Volumes (cm ³)	4840	3491	1349	38.6
								Surface Area (cm ²)	1629	1389		
								Hand only cm3	433	272		
	Tx	Norm		Tx	Norm	Tx	Norm					
0	18	16										
4	22	18	1	128	92	81	68					
8	24	20	2	169	115	92	76					
12	26	22	3	199	141	100	84					
16	28	25	4	232	176	108	95					
20	30	26	5	268	207	116	102					
24	32	27	6	306	224	124	106					
28	34	28	7	347	241	132	110					
32	36	30	8	390	268	140	116					
36	38	34	9	436	327	148	130					
40	40	35	10	485	379	156	138					
44	42	36	11	535	401	165	142					
48	44	37	12	589	424	173	146					
50	46	38	13	323	224	91	75					

Circumferences for predetermined positions are entered into the yellow columns and all else is automatically determined for you!

Segment Volumes (cm³)

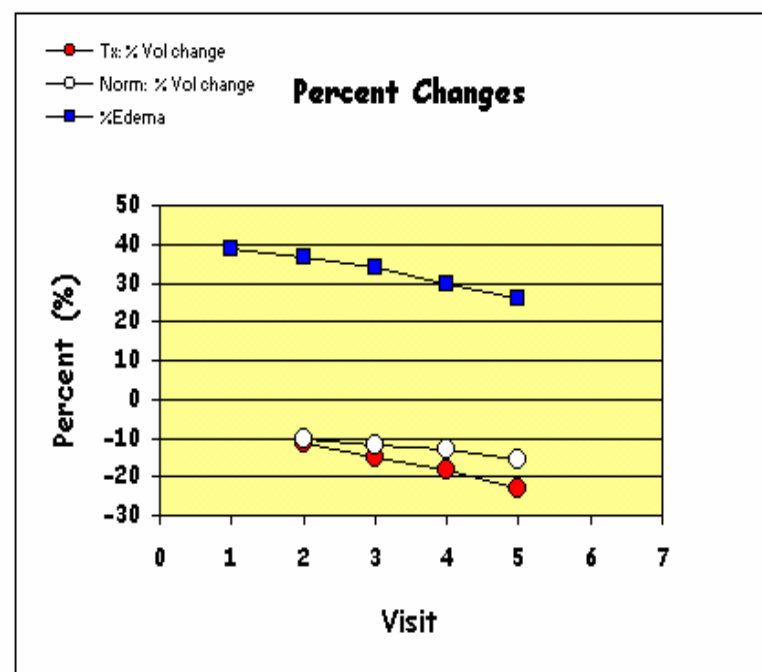
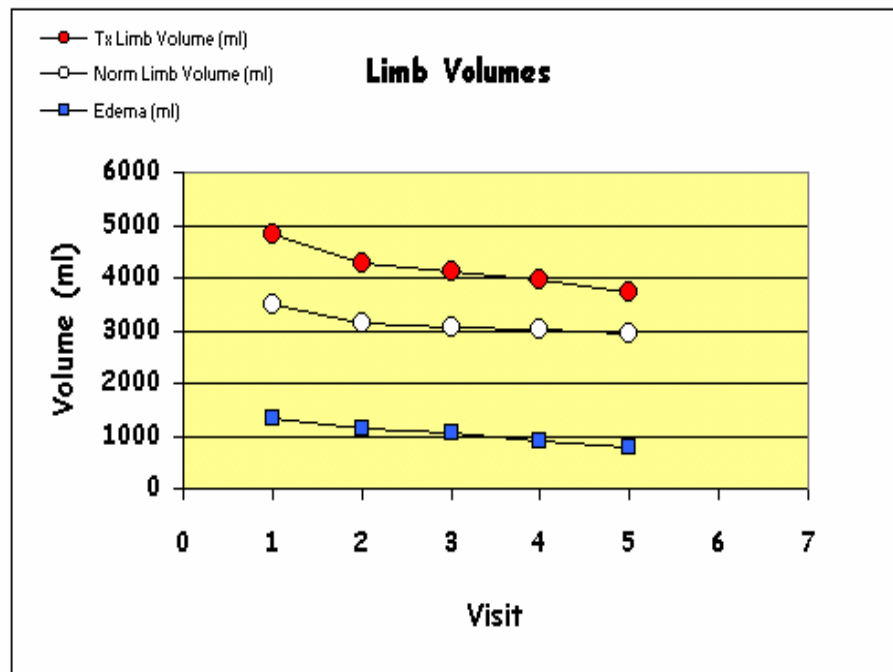
Segment Number	Tx (cm³)	Norm (cm³)
1	128	92
2	169	115
3	199	141
4	232	176
5	268	207
6	306	224
7	347	241
8	390	268
9	436	327
10	485	379
11	535	401
12	589	424
13	323	224

Graphics allow immediate comparisons

Step 7. Print Summary Report

Summary Report for Gloria Patient				ID 123-45-6789				Unilateral Upper Extremity				6/28/2003 23:57	
Visit	1	2	3	4	5	6	7	8	9	10	11	12	
Tx Limb Volume (ml)	4840	4290	4123	3943	3714								
Norm Limb Volume (ml)	3491	3138	3071	3037	2945								
Edema (ml)	1348.6	1152	1052	906.16	769.48								
%Edema	38.6	36.7	34.3	29.8	26.1								
Tx: % Vol change		-11.4	-14.8	-18.5	-23.3								
Norm: % Vol change		-10.1	-12.0	-13.0	-15.6								

All important parameters are tabulated sequentially and graphed for easy viewing. The page can be printed and used directly as the report.



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

For bilateral cases the labels are automatically changed to reflect right and left limb volumes and percentage changes in limb volume