Limb Measurement Procedures Illustrated

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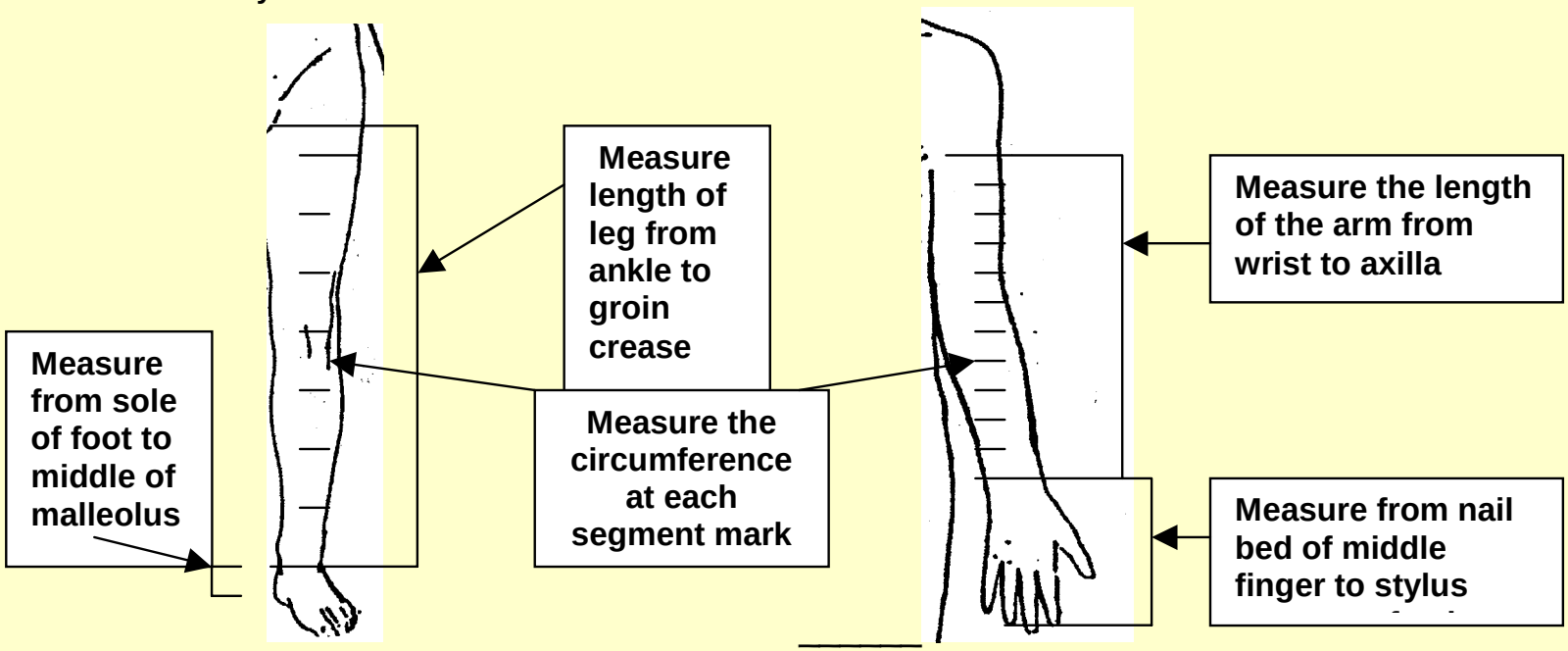
Measuring Protocol For Limb Volumes: Summary

Arm

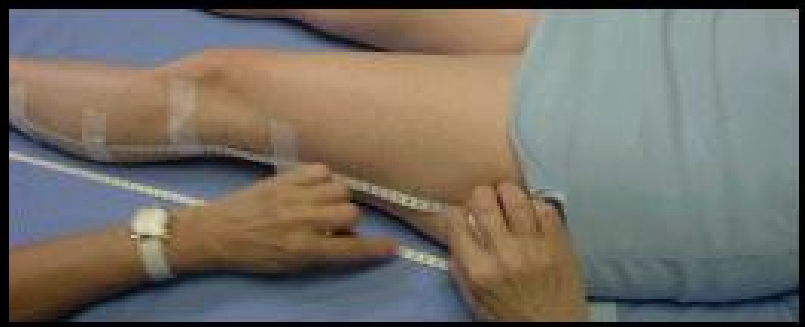
1. Client supine with arm at side.
2. Measuring board or tape measure on flat surface.
3. Measure from nail bed of middle finger and mark zero point at styloid processes of wrist and record on the form.
4. Measure length of limb from wrist to axillary crease and record on form. Place a card of stiff 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 flexed 90º.
- 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 styliad 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

If both limbs are affected (bilateral) then limbs are designated as right and left

Enter circumferences measured from wrist or ankle into **columns B and C**

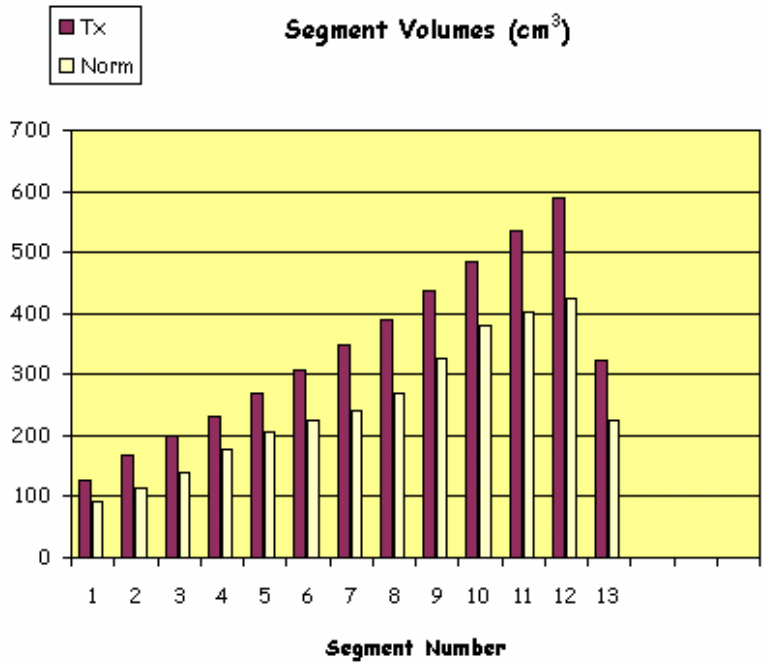
cm from wrist/ankle ◀ cm to the wrist or ankle measured from the middle finger nail bed or sole of foot

Visit 1	Limb Length	Segment Length (cm)	Total # Segments
	50	4	
From data there are	12	full segments plus one partial segment of length = 2	13

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		

For each visit limb volumes & %edema are immediately available for review

Circumferences (cm)		segment	Volume (cm^3)		Area (cm^2)	
Tx	Norm	number	Tx	Norm	Tx	Norm
18	16					
22	18	1	128	92	81	68
24	20	2	169	115	92	76
26	22	3	199	141	100	84
28	25	4	232	176	108	95
30	26	5	268	207	116	102
32	27	6	306	224	124	106
34	28	7	347	241	132	110
36	30	8	390	268	140	116
38	34	9	436	327	148	130
40	35	10	485	379	156	138
42	36	11	535	401	165	142
44	37	12	589	424	173	146
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!

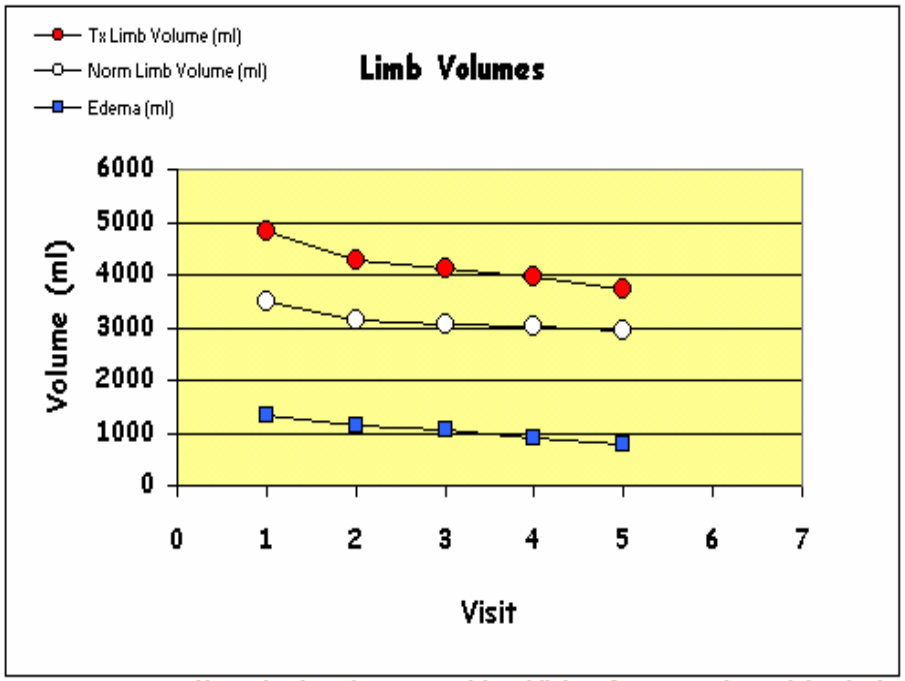
Graphics allow immediate comparsions

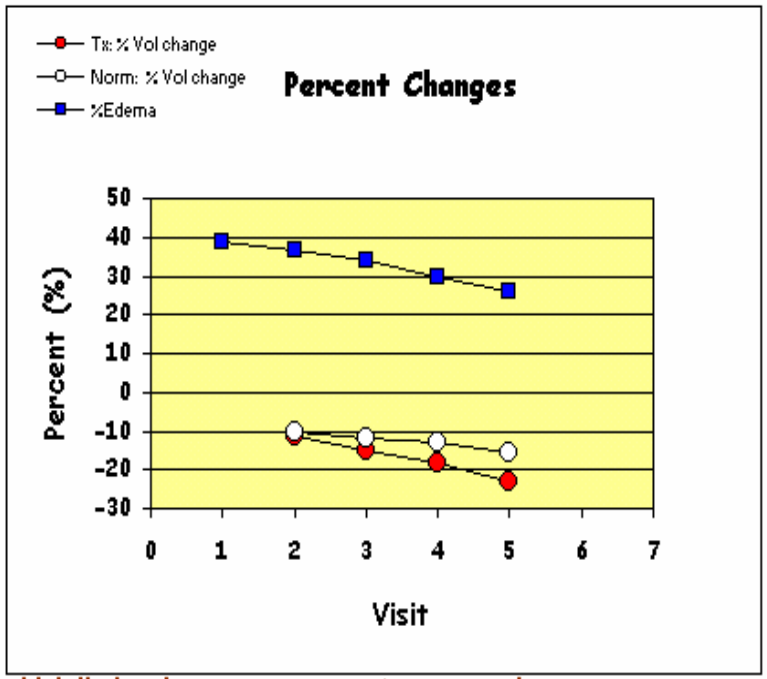
Step 7. Print Summary Report

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