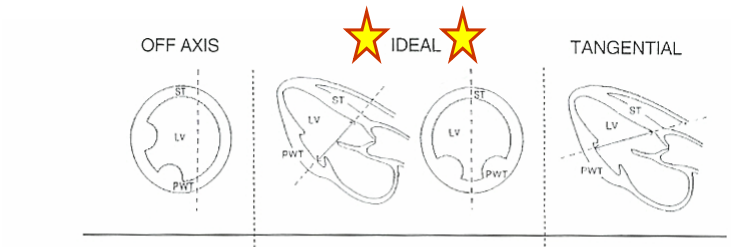
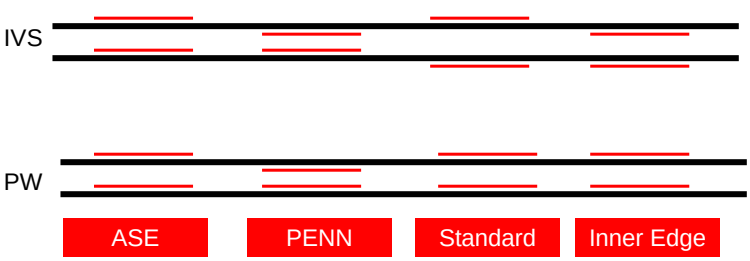
Dimensional Echo (2)

M mode measurement

Error



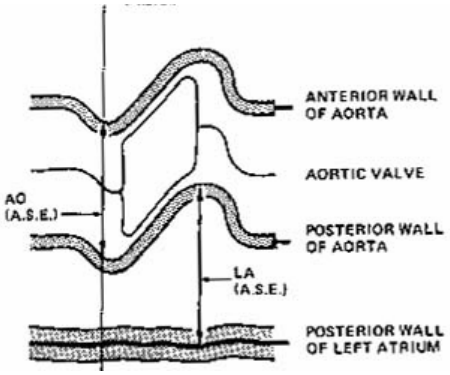
	OFF AXIS	IDEAL	TANGENTIAL
ST	10 mm	10 mm	10 mm
PWT	10 mm	10 mm	12 mm
LVIDd	46 mm	50 mm	54 mm
LV MASS	198 g	228 g	275 g

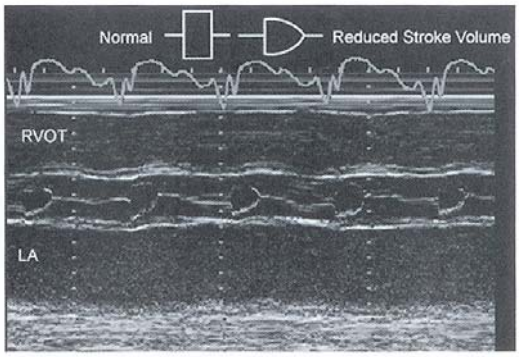


The various methodologies used for M-mode LV measurements.

The American Society of Echocardiography (ASE) convention uses the leading-edge to the leading-edge method. This method is reproducible and least dependent on instrument gain or machine processing. Other measurement methods have been used also. In the past, several studies published “normal” M-mode parameter tables using the inner-edge to inner-edge method, which yields slightly different results from the ASE standard.

Aortic root and LA dimensions





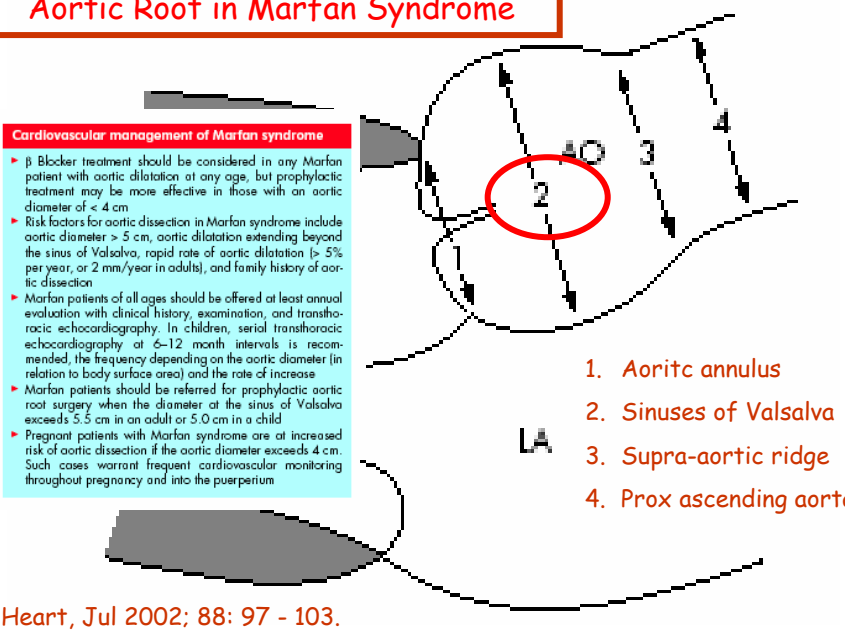
The aortic root dimension is measured at end-diastole as leading edge to leading edge, and the LA dimension is measured at end-systole as the leading edge of the posterior aortic wall to the dominant line representative of the posterior wall of the LA

An aortic cusp separation of >1.1 cm → no significant aortic stenosis.

Aortic Root in Marfan Syndrome

Cardiovascular management of Marfan syndrome

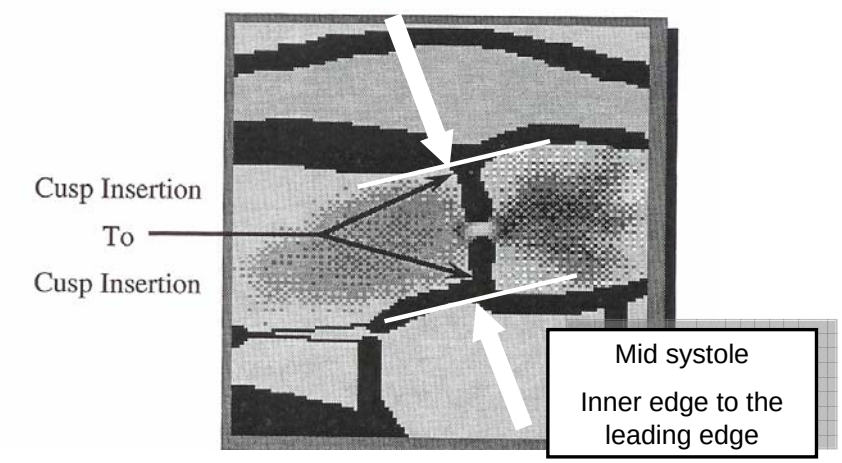
- β Blocker treatment should be considered in any Marfan patient with aortic dilatation at any age, but prophylactic treatment may be more effective in those with an aortic diameter of < 4 cm
- Risk factors for aortic dissection in Marfan syndrome include aortic diameter > 5 cm, aortic dilatation extending beyond the sinus of Valsalva, rapid rate of aortic dilatation (> 5% per year, or 2 mm/year in adults), and family history of aortic dissection
- Marfan patients of all ages should be offered at least annual evaluation with clinical history, examination, and transthoracic echocardiography. In children, serial transthoracic echocardiography at 6–12 month intervals is recommended, the frequency depending on the aortic diameter (in relation to body surface area) and the rate of increase
- Marfan patients should be referred for prophylactic aortic root surgery when the diameter at the sinus of Valsalva exceeds 5.5 cm in an adult or 5.0 cm in a child
- Pregnant patients with Marfan syndrome are at increased risk of aortic dissection if the aortic diameter exceeds 4 cm. Such cases warrant frequent cardiovascular monitoring throughout pregnancy and into the puerperium



1. Aoritc annulus
2. Sinuses of Valsalva
3. Supra-aortic ridge
4. Prox ascending aorta

Heart, Jul 2002; 88: 97 - 103.

LVOT diameter, D

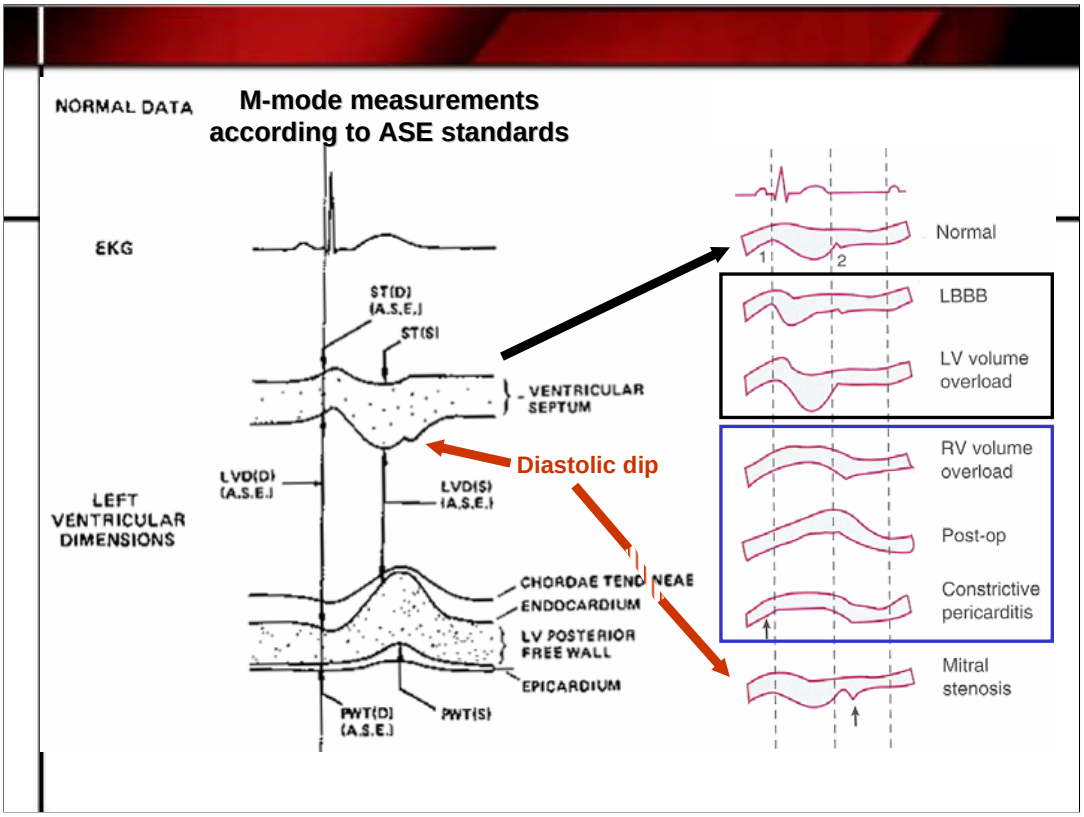


•$CSA_{LVOT} = \pi(D/2)^2$, small errors in outflow tract D will lead to large errors in calculated CSA

LVOT diameter is measured in midsystole, just proximal to and parallel with the plane of the stenotic aortic valve, from the inner edge of the septal endocardial echo to the leading edge of the base of the AMVL

Showed greatest interobserver variability.

Use the same LVOT diameter for the same patient.



End diastolic measurements are made with the onset of the QRS.

End systolic measurements are defined by ASE guidelines at the peak posterior motion of the ventricular septum. Some laboratories define end systole as the peak anterior motion of the LV posterior.

LBBB is characterized by systolic rapid downward septal motion.

LV volume overload results in exaggerated septal (and posterior wall) motion.

RV volume overload results in paradoxical anterior motion of the septum in systole

A similar pattern is seen in patients after cardiac surgery.

Constrictive pericardiits is characterized by anterior motion of the septum with atrial filling (before the onset of QRS)

Mitral stenosis typically shows a prominent early diastolic dip.

IVC	Change with respiration or "sniff"	Estimated right atrial pressure
<1.5cm	Collapse	0-5mmHg
1.5-2.5cm	↓ by >50%	5-10 mmHg
Normal	↓ by <50%	10-15mmHg
>2.5cm	↓ by <50%	15-20mmHg
Dilated with dilated hepatic veins	No change	>20mmHg

Otto; Textbook of Clinical Echocardiography 2nd ed. P.126