Background — In aortic stenosis, it is not known which between longitudinal, radial and circumferential contraction is influenced by loading conditions or remodelling. To test our hypothesis and to understand left ventricular function recovery, we investigated patients at early, i.e. 7 days (contractility enhancement load-dependent) and at late follow-up, i.e. 3 months (contractility enhancement remodelling-dependent) after transcutaneous aortic valve implantation (TAVI).

Methods and Results — Twenty-three subjects (AS: valve orifice < or =0.7 cm²; 14 female; mean age, 84±/6 years) were studied. All subjects of the study had conventional 2D-Doppler echocardiography and speckle tracking analysis (GE HealthCare). Speckle tracking was sampled in short-axis view for radial and circumferential strain and in apical 4, 3 and 2-chamber view for longitudinal strain. Measurements were performed before, 7 days and 3 months after TAVI. Mean pressure gradient decreased from 41±20 mm Hg to 10±3 mm Hg (p<0.001) while aortic valve area increased from 0.6±0.1 to 1.7±0.2 cm² (p<0.001) after implantation. Biplane Simpson EF was 50±10 %, 51±13 and 58±11 % at baseline, 7-day and 3-month follow-up (p=0.01), respectively. Improvement of circumferential strain found 7 days after TAVI is load dependant, whereas longitudinal contraction is remodeling-dependant.

Conclusion — In patients with aortic stenosis, radial contraction is load dependant, circumferential contraction is both load- and remodelling-dependant, whereas longitudinal contraction is remodeling-dependant.