Westfälische Wilhelms-Universität
Experimental Cardiac and Thoraco - Vascular Surgery
Three-dimensional Arrangement of Cardiomyocytes: Relationship to Structure and Function

Paul P. Lunkenheimer, Christoph Brune (Münster), Peter Niederer (Zürich)
Morten Smerup (Aarhus), Robert H. Anderson (London)
Otto Frank: 1901, Zeitschrift für Biologie

...to make it clear I understand the longitudinal direction of the myocardial fibres must generally be tangential with respect to the ventricular surface. If these fibres were in a normal direction to the wall surface, their shortening would induce a dilatation of the ventricle rather than a reduction in its volume... Otto Frank (Isometrie und Isotonie des Herzmuskels, Zeitschrift für Biologie 41; 14-34: 1901.)
Bundled Myocytes Splitting and Merging
Conventional Cross-Section
Semi-Circular Double Knife
MRT- Vector- Diffusion

[Image of vector diffusion patterns and bar chart showing percentage values: 65.3% and 32.1%.

Angel of Intrusion: 7.5, 15, 22.5, 30, 37.5, 45.

Segment Length: 50%]

[Graph showing bar chart with percentage values and segment lengths.

- 65.3% at 7.5
- 32.1% at 37.5]
Contraction of oblique transmural Netting

Ca^{++}  Heat
Distribution of Interstitial Clefts

Cross

Length
Spiral Staircase
Computed „motion“ field between slices 633 and 634
Needle - Force - Probe

(1) DMS  (2) Flexural Bar  (3) Thermistor  
(4) Outer Tube  (5) Lateral Window  
(6) Bar Support  (7) PE-Catheter
Auxotonic versus Unloading Forces
ECC – Unloading VS β - Blockade

- Left Ventricular Pressure
- Unloading Tensile Force
- Auxotonic Tensile Force
- Left Ventricular Diameter

Bleeding (2 l, 15 minutes)

50 mg esmolol HCl

- Force (mN)
- Pressure (mmHg)

1 sec 100 sec
Myocardial Fibrosis