

# Optimization of left ventricular muscle fiber orientation

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## Propositions

included with the thesis entitled  
'optimization of left ventricular muscle fiber orientation'

Jons Rijcken

11th September 1997

1. The distribution of muscle fiber orientation in the left ventricular wall of the heart is such that fiber strain and thus sarcomere length during the ejection phase of the cardiac cycle is as homogeneous as possible.  
(this thesis)
2. The difference in the distribution of muscle fiber orientation obtained by minimization of inhomogeneities in the left ventricular wall of either fiber shortening during ejection or of mean fiber strain during ejection is negligible.  
(this thesis)
3. The spatial distribution over the left ventricular wall of the transmural component of fiber direction is important for the reduction of shearing deformation of the wall as well as for homogeneity of muscle fiber strain.  
(Bovendeerd *et al.* J Biomechanics 27:942-951, 1994,  
this thesis)
4. Diffusion tensor imaging in multiple short axis slices of the left ventricular wall, in combination with averaging of diffusion tensors in circumferential direction is a suitable technique for quantification of the spatial distribution of the transmural component of muscle fiber direction.  
(this thesis)
5. Application of simultaneous changes in the configuration of a multi-unit system striving for optimality increases the rate at which the optimum is found. Applied to the heart, this indicates that simultaneous changes in structure at many places in the cardiac walls contribute to an increased ability of the heart to adapt to changes in mechanical loading of the walls.  
(Macready *et al.* Science 271:56-59, 1996)
6. Warm-up, cool-down, and stretching exercises do not contribute to the prevention of injuries in long distance running.  
(van Mechelen *et al.* Am J Sports Med 21:711-719, 1996)

7. The beneficial effects of brushing a toddler's teeth outweigh the daily persuasion necessary to get it done.

(Jones *et al.* British Dental J 181:13-17, 1996,  
Tsubouchi *et al.* ASDC J Dent child 62:283-287, 1995,  
Faine *et al.* ASDC J Dent child 61:350-355, 1994)

8. In the evaluation of the costs and benefits of participation in international conferences, the environmental costs of travel should take a more prominent position.
9. The striving for a simpler life is generally irreconcilable with double careers, and children.
10. People often find it easier to be a result of the past than a cause of the future.

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