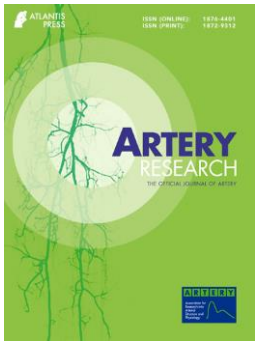

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8.6: AEROBIC FITNESS LEVEL AND PERIPHERAL ARTERIAL COMPLIANCE – THE ROLE OF AUTONOMIC NERVOUS SYSTEM TONE

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8.5
HEMODYNAMICS DURING INTRA- AND INTERDIALYTIC PERIODS DEPEND ON ULTRAFILTRATION VOLUME

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Introduction: Parameters of arterial stiffness are independent cardiovascular risk factors for end-stage renal disease patients. Significant changes of these parameters between intra- and interdialytic periods have been reported previously [1]. The aim of this cross-sectional study is to describe the influence of the ultrafiltration volume on hemodynamic parameters.
Methods: All measurements were obtained with the Mobil-O-Graph 24h PWA (I.E.M. GmbH, Germany) within the ISAR hemodialysis study. Measurement started before the midweek dialysis session and lasted for 24-hours. 348 patients (238 male / 110 female 65 +- 18 years) were included. Intra- and interdialytic parameters were averaged and compared for three subgroups (ultrafiltration volume (UFV) $<=$ 500 ml (N = 50) 500 $<$ UFV$<=$ 2000 ml (N = 159) UFV $>$ 2000 ml (N = 139)) and all subjects.
Results: The results for all patients support the findings of Karpetas et al. [1] (see Table). Beyond [1], the results underpin the differences between subgroups for intra- and interdialytic periods. Furthermore, there are significant differences between intra- and interdialytic periods depending on the ultrafiltration volume (see Table). Exemplarily, there is a significant rise in the augmentation index (26.0 vs. 28.5%, $p < 0.05$) for UFV $>$ 2000 ml and for central pulse pressure (39.6 vs. 43.4 mmHg and 36.0 vs. 38.3, $p < 0.05$) for UFV $<=$ 2000 ml opposed to non-significance for the other subgroups.
Conclusions: Our findings support the hypothesis that hemodynamic parameters depend on ultrafiltration volume. Further studies should investigate their prognostic value considering the ultrafiltration volume.

	UFV $<=$ 500 ml			500 $<$ UFV $<=$ 2000 ml			UFV $>$ 2000 ml			All		
	In		Out	In		Out	In		Out	In		Out
pSBP (mmHg)	128.9		131.0	123.7		122.3	124.5		123.0	124.8		123.8
pDBP (mmHg)	75.9		74.5	74.9		72.3	75.6		73.1	75.3	*	72.9
pPP (mmHg)	53.0		56.5	48.8		50.0	478.8		49.9	49.4		50.9
HR (bpm)	69.4		70.2	68.1	*	70.8	71.8		73.7	69.8	*	71.9
cSBP (mmHg)	116.9		119.3	112.4		111.9	113.4		112.6	113.4		113.2
cDBP (mmHg)	77.3		75.9	76.3		73.6	77.2		74.6	76.8	*	74.3
cPP (mmHg)	39.6	*	43.4	36.0	*	38.3	36.2		38.0	36.6	**	38.9
AIx (%)	29.7		31.8	29.5		30.2	26.0	*	28.5	28.1	*	29.8
AIx75 (%)	26.4		28.8	25.5	*	27.7	24.0	**	27.6	25.1	**	27.8
PWV (m/s)	10.03		10.14	9.88		9.85	9.08		9.07	9.58		9.58

Table: Averaged hemodynamic parameters for intra- and interdialytic periods (In vs. Out) for different subgroups based on ultrafiltration volume (UF) and all subjects. Abbreviations: peripheral diastolic blood pressure (pDBP), peripheral systolic blood pressure (pSBP), peripheral pulse pressure (pPP), heart rate (HR), central diastolic blood pressure (cDBP), central systolic blood pressure (cSBP), peripheral pulse pressure (pPP), augmentation index (AIx, AIx75) and pulse wave velocity (PWV) */** marks a significant difference between intra- and interdialytic periods ($p < 0.05$ and $p < 0.01$, respectively).

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8.6
AEROBIC FITNESS LEVEL AND PERIPHERAL ARTERIAL COMPLIANCE — THE ROLE OF AUTONOMIC NERVOUS SYSTEM TONE

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Physical activity has beneficial effects on prevention of cardiovascular disease. Aerobic fitness is associated with higher central arterial compliance, but its effect on peripheral arterial compliance (pC) is controversial. We aimed to test the hypotheses that aerobic training augments pC at rest and during different autonomic nervous system provocations (ANSP) inyoung healthy men.
We enrolled 44 males, 19-24 years old (22 trained, VO2max=485ml/kg/min — group A, 22 sedentary controls, VO2max=303ml/kg/min — group B). VO2max was determined using cycloergometry (QuarkCPET, Cosmed). On the testing day, ECG, arterial blood pressure (Finapres, Ohmeda) and finger artery compliance at rest, 3 minutes during 0.1Hz breathing and 3 min during mental stress were measured. A noninvasive method was used to determine compliance index (CI), calculated as an average of the pressure dependant compliance curve in the range of arterial pressures from 97 to 105mmHg.
Our results revealed elevated CI in group A compared to group B (4.18±0.38 and 1.28±0.25, p=0.004) at rest and no significant differences in CI between groups during ANSP (1.34±0.20 at 0.1Hz breathing and 0.82±0.18 during mental stress in group A compared to 1.09±0.21, p=0.06, and 0.60±0.12, p=0.08 in group B). A statistically significant positive linear correlation existed between CI and VO2max ($P<0.001$) at rest in group A, however, no correlation was found at both ANSP.
Regular aerobic training increases pC in healthy young subjects at rest, but not during 0.1Hz breathing or mental stress. Our findings indicate that peripheral and not central autonomic mechanisms govern pC in young healthy males.

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8.7
CHANGES IN CARDIAC FUNCTION BUT NOT STRUCTURE IN HEALTHY SUBJECTS WITH PREMATURE VASCULAR AGEING

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Purpose: Changes in myocardial and arterial wall properties/function are consistently reported in patients with established cardiovascular disease[1]. However, few studies have reported these changes in early subclinical disease. The aim of the present study was to examine cardiac and vascular changes in early subclinical disease and to determine whether these changes occur in parallel.
Methods: For this study, 98 healthy lifelong never smokers were recruited. Subjects were categorised as having normal (Norm, n=71) or abnormal (High. n=27) arterial stiffness (carotid-femoral pulse wave velocity, PWV Vicorder, Skidmore, UK) for their age and blood pressure. M-mode Doppler echocardiography (Vivid 7 Dimension, GE, USA) was used to assess heart structure (interventricular septal thickness, IVSd left ventricular internal diameter, LVIDd left ventricular posterior wall thickness, LVPW left ventricular mass, LV Mass) and function (left ventricular isovolumetric relaxation time, LV IVRT mitral valve early/late filling velocity, MV E/A).