

# Osteopathic manipulation as a complementary treatment for the prevention of cardiac complications: 12-Months follow-up of intima-media and blood pressure on a cohort affected by hypertension

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# Introduction

## Association between hypertension, endothelial wall modification and cardiologic events

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# Introduction

## Association between hypertension, endothelial wall modification and cardiologic events

- Simon, A., Gariepy, J., Chironi, G., Megnien, J.L., Levenson, J., 2002. Intima-media thickness: a new tool for diagnosis and treatment of cardiovascular risk. *Journal of Hypertension* 20, 159e169.
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## Association between hypertension, endothelial wall modification and cardiologic events

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# Introduction

## Association between hypertension, endothelial

## wall modification and cardiologic events

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- Belcaro, G., Nicolaidis, A.N., Ramaswami, G., Cesarone, M.R., De Sanctis, M., Incandela, L., et al., 2001. Carotid and femoral ultrasound morphology screening and cardiovascular events in low risk subjects: a 10-year follow-up study (the CAFES-CAVE study(1)). *Atherosclerosis* 156, 379e387.

# Introduction

## Somatic dysfunction, manipulation and hypertension

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# Aim of the study

- Is there a statistically significant association between OMT and change in Blood Pressure (BP), Intima-media thickness (IMT) at 12 months?

# Methods

- Non randomized trial at cardiologic practice
- Baseline measurements of clinical characteristics (BMI, BP, etc.)
- Visits at 0, 1, 3, 6, 12 months
- Outcomes: changes in systolic and diastolic BP and from baseline for IMT



# Treatment

# Procedures

- OMT was performed on the part of the body presenting greater TART modification using fascial, cranial and balanced ligamentous tension techniques

Palpatory finding	Meaning
Tissue Alteration	Modifications in the quality of the tissue (dry or moist, heat or coolness, pale or red). Expression of ANS alterations.
Asymmetry	Body segmental differences positions in the space, both in standing, sitting and lying position.
Restriction of motion	Unusual motion of one body part compared with the same part of the other side.
Tenderness	Feel the tissue response through a light compression.

# Statistical Analysis

- Arithmetic means and SD for the general characteristics of the study population
- Univariate statistical tests for all differences between study and control group
- Multivariate linear regression for OMT on primary outcomes

# Study Population

	Study Group	Control Group	p value
N*	31 (49.2)	32 (50.8)	
Males*	16 (51.6)	15 (46.9)	0.70
Age	50.0 ± 5.7	49.6 ± 6.1	0.79
Height	1.7 ± 0.1	1.7 ± 0.1	0.75
Weight	70.8 ± 8.1	71.6 ± 8.6	0.76
IMT	2.8 ± 1.5	3.0 ± 1.6	0.60
BMI	24.6 ± 1.7	24.9 ± 1.3	0.31
SBP	148.9 ± 5.7	149.2 ± 6.1	0.85
DBP	93.4 ± 4.3	93.1 ± 4.0	0.73
Heart Rate	69.1 ± 4.0	69.0 ± 4.4	0.97

Numbers in table are mean±s.d.; p value from t test  
\*n(%);p value from  $\chi^2$  test



# Multivariate Analysis (I)

## Demographic and clinical characteristic

	$\Delta$ IMT <sub>t12- t0</sub>			$\Delta$ SBP <sub>t12- t0</sub>			$\Delta$ DBP <sub>t12- t0</sub>		
	$\beta$	95%c.i.	$p > \chi^2$	$\beta$	95%c.i.	$p > \chi^2$	$\beta$	95%c.i.	$p > \chi^2$
Male	-0.078	-0.197–0.040	0.190	-0.529	-1.856 – 0.799	0.428	0.345	-0.839 – 1.530	0.560
Age	0.009	-0.001–0.018	0.068	0.017	-0.089 – 0.125	0.742	-0.044	-0.138 – 0.051	0.359
BMI	0.046	0.004 – 0.088	0.033	-0.045	-0.531 – 0.441	0.853	0.151	-0.280 – 0.581	0.484
Heart Rate	-0.001	-0.025–0.023	0.915	0.064	-0.200 – 0.327	0.630	0.073	-0.161 – 0.307	0.536



# Multivariate Analysis (2)

## Pharmaceutical treatments

	$\Delta \text{IMT}_{t12-t0}$			$\Delta \text{SBP}_{t12-t0}$			$\Delta \text{DBP}_{t12-t0}$		
	$\beta$	95%c.i.	$p > \chi^2$	$\beta$	95%c.i.	$p > \chi^2$	$\beta$	95%c.i.	$p > \chi^2$
Tot Dose $t_0$	0.0004	-0.001 – -0.001	0.414	-0.001	-0.013 – -0.0012	0.887	0.005	-0.005 – -0.016	0.336
Tot Dose $t_0-t_{12}$	0.004	0.001 – -0.006	0.007	0.003	-0.028 – -0.035	0.834	0.005	-0.023 – -0.032	0.737

# Multivariate Analysis (3)

cardiovascular parameters at baseline and after 12 month

	$\Delta$ IMT $t_{12}-t_0$			$\Delta$ SBP $t_{12}-t_0$			$\Delta$ DBP $t_{12}-t_0$		
	$\beta$	95%c.i.	$p>\chi^2$	$\beta$	95%c.i.	$p>\chi^2$	$\beta$	95%c.i.	$p>\chi^2$
IMT $t_0$	-0.005	-0.080 - 0.069	0.889	<u>1.106</u>	<u>0.341 - 1.871</u>	<u>0.005</u>	-0.525	-1.245 - 0.195	0.149
$\Delta$ IMT $t_{12}-t_0$				-1.126	-4.258 - 2.006	0.473	-0.615	-3.409 - 2.180	0.661
SBP $t_0$	-0.028	-0.0066 - 0.009	0.138	<u>-0.894</u>	<u>-1.239 - -0.550</u>	<u>&lt;.0001</u>	<u>0.591</u>	<u>0.249 - 0.933</u>	<u>0.001</u>
$\Delta$ SBP $t_{12}-t_0$	-0.009	-0.035 - 0.0016	0.437				<u>0.394</u>	<u>0.168 - 0.621</u>	<u>&lt;.0001</u>
DBP $t_0$	0.041	-0.007 - 0.089	0.070	<u>0.654</u>	<u>0.173 - 1.135</u>	<u>0.009</u>	<u>-1.080</u>	<u>-1.422 - -0.740</u>	<u>&lt;.0001</u>
$\Delta$ DBP $t_{12}-t_0$	-0.035	-0.006 - 0.022	0.661	<u>0.499</u>	<u>0.212 - 0.785</u>	<u>&lt;.0001</u>	..	.	

# Multivariate Analysis (4) effect of OMT

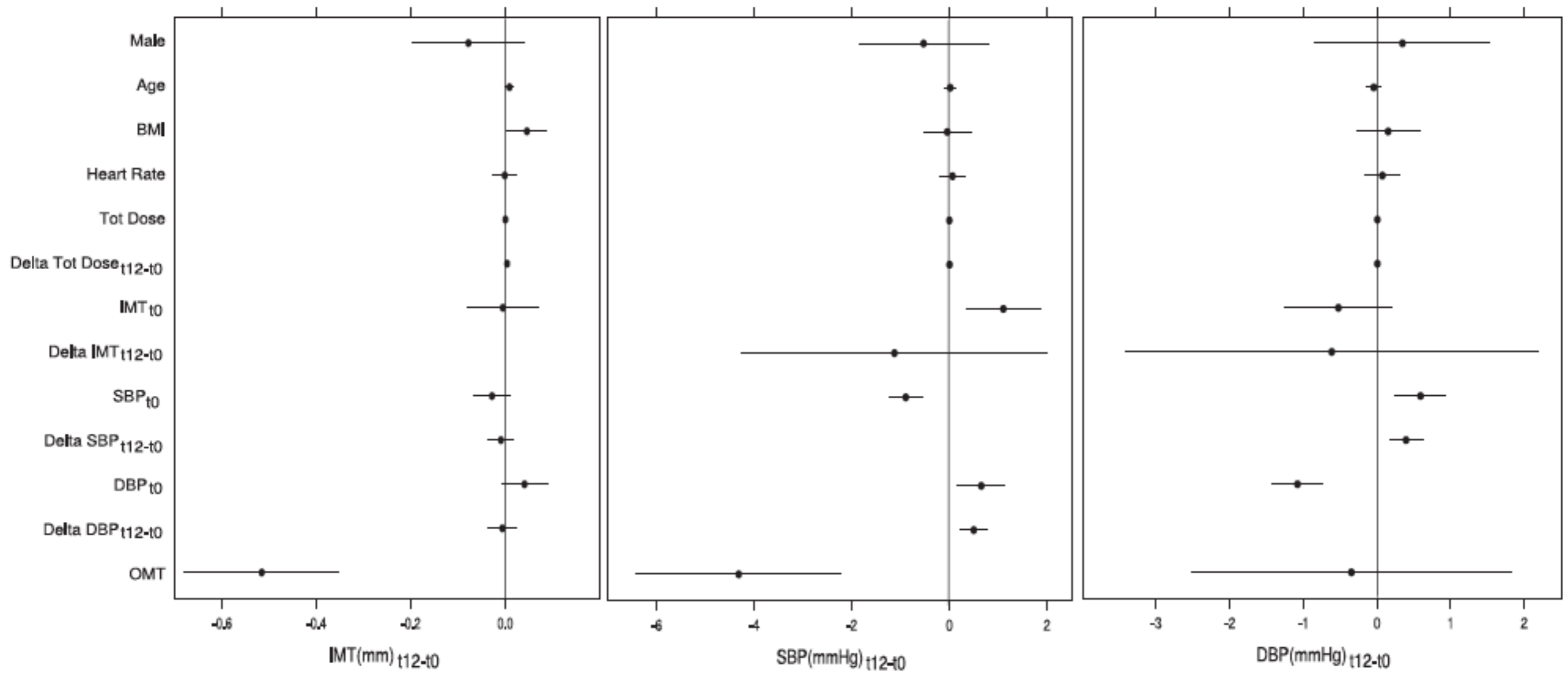
	$\Delta$ IMT t12- t0			$\Delta$ SBP t12- t0			$\Delta$ DBP t12- t0		
	$\beta$	95%c.i.	$p>\chi^2$	$\beta$	95%c.i.	$p>\chi^2$	$\beta$	95%c.i.	$p>\chi^2$
<b>OMT</b>	-0.613	-0.680 – -0.353	<.0001	-4.317	-6.421 – -2.214	<.0001	0.348	-2.511 – 1.816	0.748

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# Discussion

## Effect of OMT on the cardiovascular system

- Williams AM. An osteopathic cardiologist's review of hypertension: beyond the Fifth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. *J Am Osteopath Assoc.* 1994 Oct;94(10):833-47.
- Celander E, Koenig AJ, Celander DR. Effect of osteopathic manipulative therapy on autonomic tone as evidenced by blood pressure changes and activity of the fibrinolytic system. *J Am Osteopath Assoc.* 1968 May;67(9):1037-8
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- Spiegel, A.J., Capobianco, J.D., Kruger, A., Spinner, W.D., 2003. Osteopathic manipulative medicine in the treatment of hypertension:an alternative, conventional approach. *Heart Disease* 5, 272e278.

# Discussion

BP is influenced by several factors:

- Neurological:

Narkiewicz K, Phillips BG, Kato M, Hering D, Bieniaszewski L, Somers VK. Gender-selective interaction between aging, blood pressure, and sympathetic nerve activity. *Hypertension*. 2005 Apr;45(4):522-5.

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# Discussion

BP is influenced by several factors:

- Neurohumoral:

Schlaich MP, Lambert E, Kaye DM, Krozowski Z, Campbell DJ, Lambert G, Hastings J, Aggarwal A, Esler MD. Sympathetic augmentation in hypertension: role of nerve firing, norepinephrine reuptake, and Angiotensin neuromodulation. *Hypertension*. 2004 Feb;43(2):169-75.

# Discussion

## OMT effects on sympathetic activity and systolic blood pressure

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# Discussion

## IMT as cardiovascular risk factors

- Henley C.E., Ivins D., Mills M., Wen F.K., Benjamin B.A. Oklahoma State University Center for Health Sciences Department of Pharmacology and Physiology, Tulsa, OK 74107, USA. Osteopathic manipulative treatment and its relationship to autonomic nervous system activity as demonstrated by heart rate variability: a repeated measures study.
- Cheng K.S., Mikhailidis D.P., Hamilton G., Seifalian A.M. 2002 A review of the carotid and femoral intima-media thickness as an indicator of the presence of peripheral vascular disease and cardiovascular risk factors

# Discussion

## OMT effects on the production of inflammatory factors (cytokines)

- Meltzer, K.R., Standley, P.R., 2007. Modeled repetitive motion strain and indirect osteopathic manipulative techniques in regulation of human fibroblast proliferation and interleukin secretion. *Journal of American Osteopathic Association* 107, 527e536.

# Limitation

- No random allocation
- No formal computation of power and sample size
- No data on practice variation

# Conclusions (1)

- The present study shows that after a one-year follow-up, osteopathic treatment is independently associated to a statistically significant improvement in systolic blood pressure and IMT.



# Conclusions (2)

- Our study calls for further research:
- Broader population
- Multicentric randomized control trial



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# Thanks for your attention

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