

***A Naturalistic Study of  
Acupuncture in Modulating  
Heart Rate Variability***

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# Southern Medical University

- ❑ Locates in Guangzhou, was the former First Military Medical University of China.
- ❑ At present, SMU has been authorized by the Guangdong province as a key medical university.



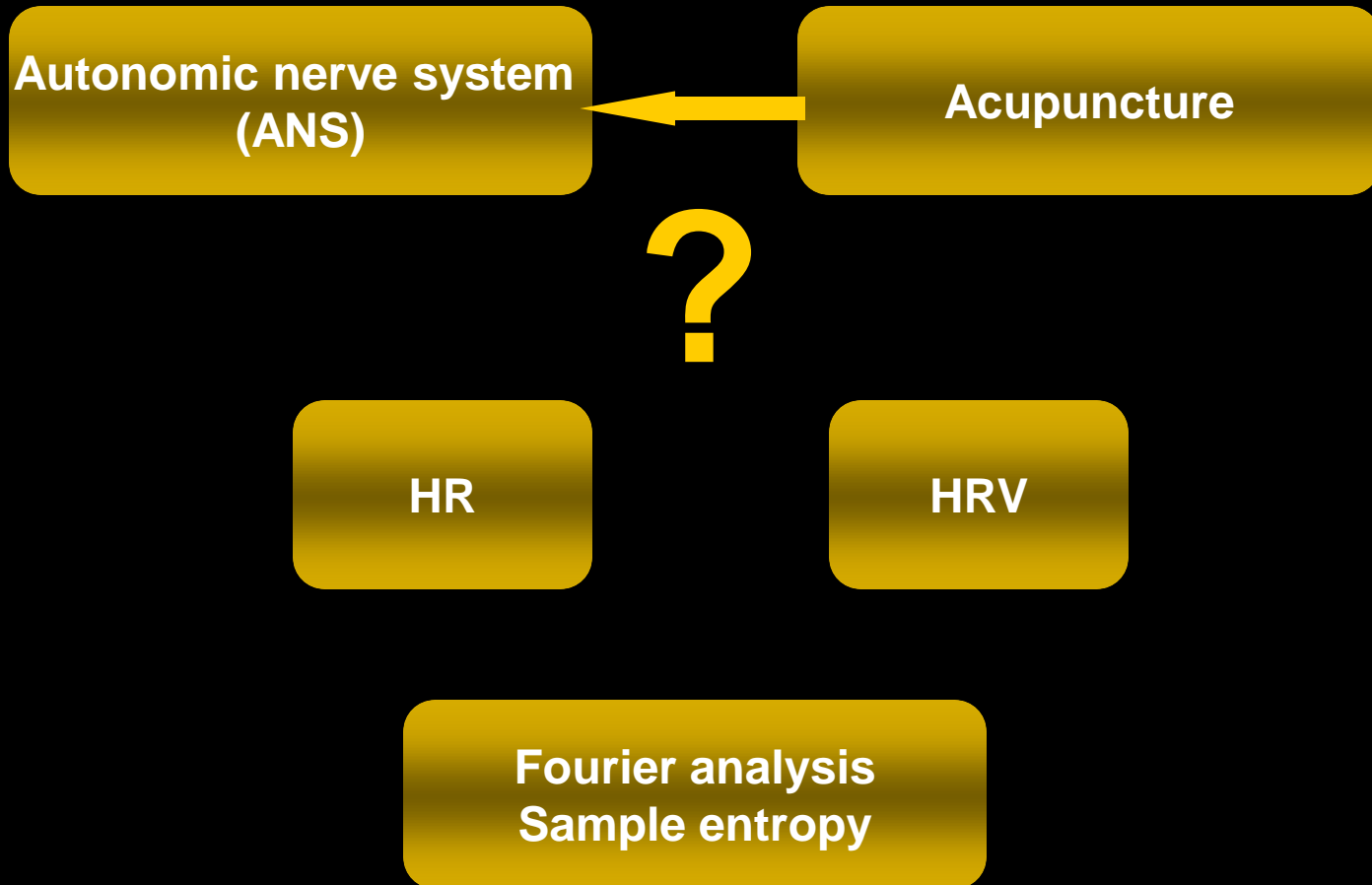


# ***A Naturalistic Study of Acupuncture in Modulating Heart Rate Variability***

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## Introduction





In the present study the analysis of heart rate variability is used to address two questions:

- ❑ If acupuncture could alter vagal activity in a clinical setting, in patients having different clinical conditions.
- ❑ If acupuncture could change the complexity of the heart rate time series, measured with sample entropy.



## Materials and Methods

### 1. Patients

- we consecutively recruited 40 patients
- 10 kinds of diseases,
- 24 men and 16 women
- mean age  $29 \pm 10.6$  years (SD), range 17 to 55 years





## 2. Acupuncture

Diseases	N	Main acupoints
Insomnia	4	HT7, PC 6, DU20, LR3
Stomachache	4	RN 12, PC 6, ST 36, LR 3, GB 34, ST 44
Diarrhea	4	ST 25, ST 36, BL 25, LI 11
Dizziness	3	LR 3, LR 2, ST 36, EX-HN 3, GB 20, KI 3, BL 23
Cervical syndrome	4	GB 20, BL10, DU 14, EX-B2
Low back pain	3	BL 23, BL 25, EX-B2, BL 40
Gonarthrosis	3	EX-LE 2, EX-LE 5, SP10, ST 34, ST 36, SP 9, GB 39
Peripheral facial paralysis	6	LI 20, ST 7, GB 20, ST 4, ST 6, GB 14, EX-HN 5
Post-traumatic organic Brain syndrome	5	LI15, LI11, SJ5, LI4, ST34, ST36, GB39
Urinary retention	4	RN 3, RN 6, ST 25, SP 9, ST 40, lateral III line of the Forehead



## 3. Recording of heart rate variability

The Actiheart, combines heart rate monitor and movement sensor, was used to record heart rate variability (HRV).



# Materials and Methods

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## 4. Data analysis

- Heart rate data were first analyzed using standard time-domain and frequency-domain indexes
- We also calculated sample entropy, which is a nonlinear measure developed to compute the regularity (complexity) of heart rate and other time series
- SPSS version 15.0 (Chicago, IL, USA)



## Effects of acupuncture on HRV

	Period A	Period B	Period C
<b>Heart rate (BPM)</b>	<b>70.3 ± 9.5</b>	<b>68.0 ± 9.3</b>	<b>70.2 ± 10.2</b>
<b>SD</b>	<b>90.9 ± 37.3</b>	<b>53.8 ± 28.2</b>	<b>70.7 ± 39.2</b>
<b>RMSSD</b>	<b>77.6 ± 55.6</b>	<b>48.2 ± 37.6</b>	<b>67.0 ± 51.5</b>
<b>In LF</b>	<b>7.61 ± 1.05</b>	<b>6.69 ± 1.27</b>	<b>7.43 ± 1.37</b>
<b>In HF</b>	<b>7.16 ± 1.39</b>	<b>6.28 ± 1.43</b>	<b>7.07 ± 1.53</b>
<b>LFn (LF/LF + HF)</b>	<b>0.602 ± 0.17</b>	<b>0.590 ± 0.16</b>	<b>0.580 ± 0.16</b>
<b>HF n (HF/LF + HF)</b>	<b>0.398 ± 0.17</b>	<b>0.410 ± 0.16</b>	<b>0.420 ± 0.16</b>
<b>LF/HF</b>	<b>2.07 ± 1.56</b>	<b>1.90 ± 1.37</b>	<b>1.83 ± 1.37</b>
<b>Sample entropy</b>	<b>1.18 ± 0.45</b>	<b>1.59 ± 0.29</b>	<b>1.28 ± 0.49</b>



## Relation Analysis

- Analysis on Gender: Sample entropy, SD, RMSSD
- Analysis on Age: RMSSD
- Analysis on Sample entropy: SD, RMSSD, lnLF, lnHF



## Discussion

- ❑ The main findings from this study were that acupuncture treatment, had a very pronounced effect on heart rate variability measures, reducing variability and at the same time increasing complexity of the time series.
- ❑ Both age and gender may influence measures of HRV.
- ❑ Our findings indicate that the pattern of reduced variability and increased complexity may be a general effect of acupuncture, not dependent on a specific location of the needles nor on a specific type of medical problem.



There are no immediate clinical applications of the present findings. They are primarily interesting as clues to how acupuncture may alter the function of the autonomic nervous system, and heal pathological conditions.





- Acupuncture induced pronounced alterations in heart rate variability, without altering either heart rate or sympatho-vagal balance, which is opposite to that seen in a number of pathological conditions of the human body.
- This demonstrates that acupuncture may alter physiological parameters of the human body.

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# Thank you!

