

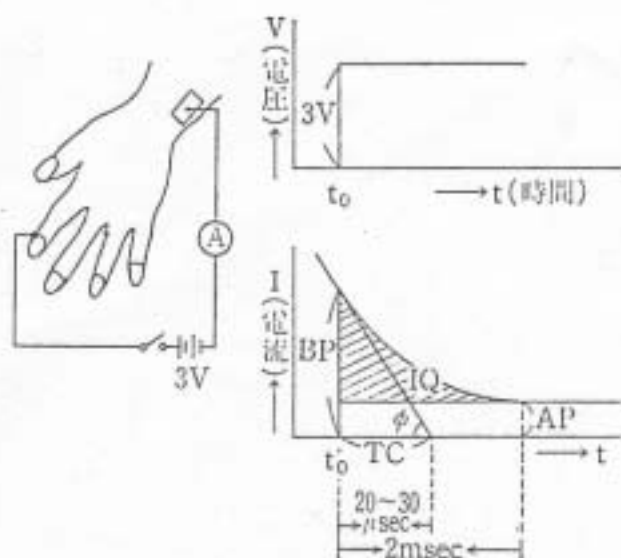
I. BP Is a Parameter Reflecting Meridian Function. Evidence Suggests That the Dermal Connective Tissue Is the Physical Location of the Acupuncture Meridian

(I) BP Alone of the 4 Parameters (BP, AP, IQ and TC) Shows a Close Relationship with the Meridian Function

1) Interpretation of BP, AP, IQ and TC

This study consisted of mathematical analysis of AMI data from two groups of subjects: Group 1: 29 healthy subjects and Group 2: 29 clinical subjects.

The measurement method utilizing the AMI was detailed in Chapter I "Electrophysiological and Preliminary Biochemical Studies of Skin Properties in Relation to the Acupuncture Meridian", but here I will give a brief outline of the procedure: 3.0 volt; 1msec square wave pulses are sequentially applied between active electrodes (3mm diameter) located at each of the 28 Sei points³ situated near the proximal edges of the fingernails and toenails, and 2 large indifferent electrodes located on the wrists. The computerized AMI system then calculates the resultant current-response curve. The figure below gives a mathematical description of each of these parameters.



1. BP (Before Polarization): The current value before ionic polarization in the skin proceeds against the externally applied potential.
2. AP (After Polarization): The current value which still flows even after the completion of ionic polarization in the skin.
3. IQ (Integrated Polarization Charge):

$$IQ = \int_0^{t_0} (I_0 - I(t)) dt$$

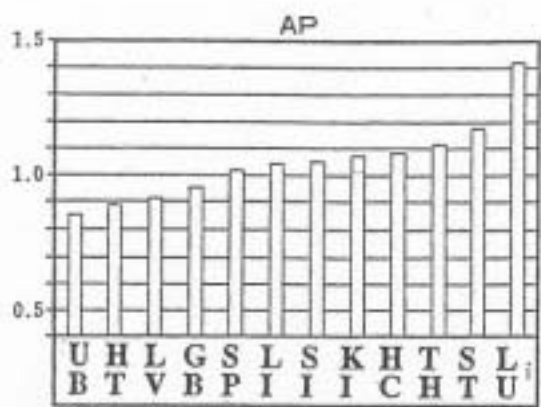
The total electrical charge of ions incurred during the polarization.

4. TC (Time Constant):

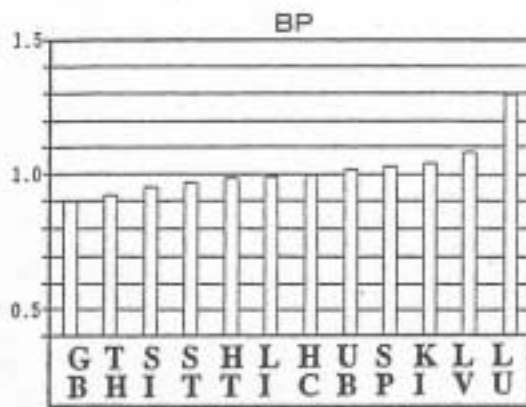
$$TC = \frac{BP}{\tan \phi} = \frac{I_0}{-\frac{dI}{dt} \Big|_{t=0}}$$

The time required for the ionic transfer.

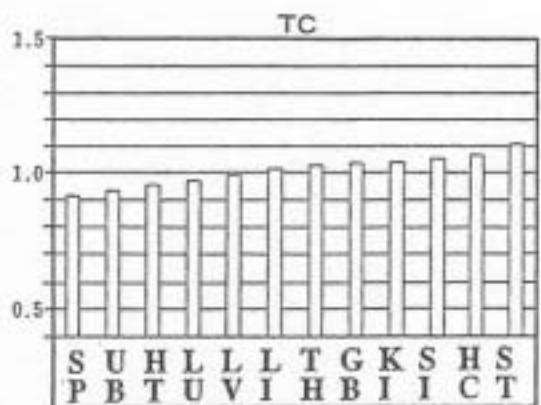
Table B: $L\% \bar{X}$



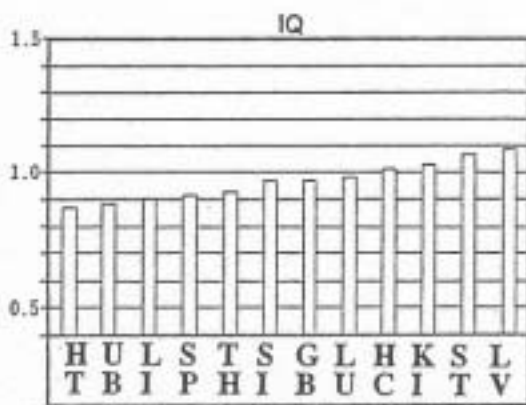
No consistent relationship between Yin-Yang pairs



BP of the Yin meridian > BP of the Yang partner

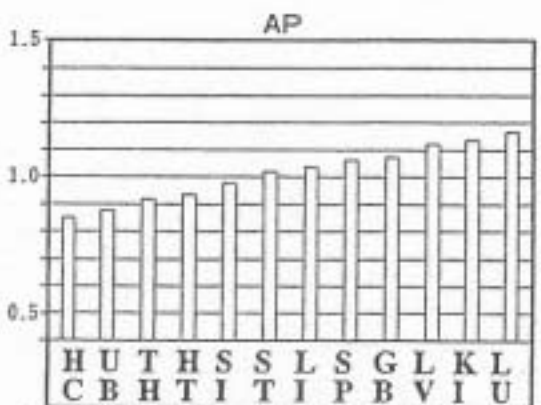


High TC values in the Yang meridians

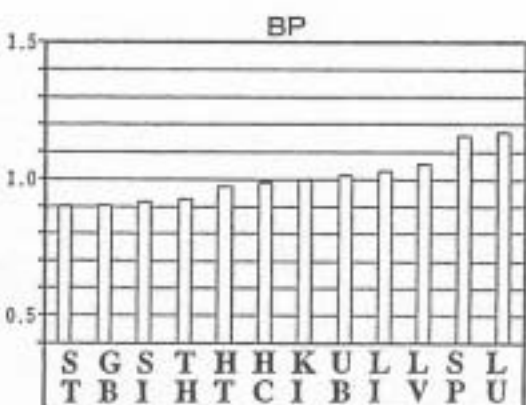


No consistent relationship between Yin-Yang pairs

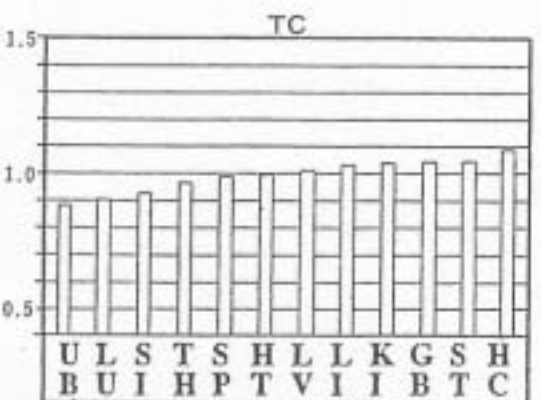
Table C: $R\% \bar{X}$



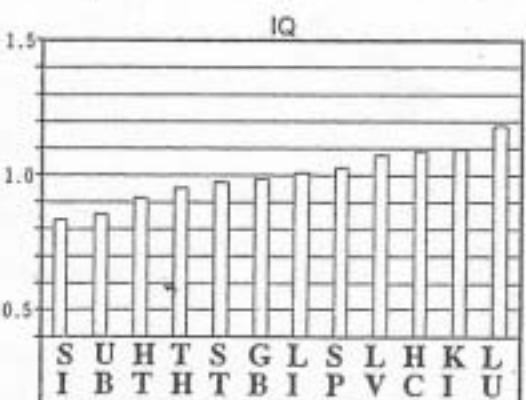
No consistent relationship between Yin-Yang pairs



Except for the KI-UB pair, Yin BP > Yang BP



No consistent relationship between Yin-Yang pairs



IQ of the Yin meridian > IQ of the Yang partner

In Table A, we have in histogram form the average results from 29 healthy subjects (Group 1) of L% and R% (normalized BP, AP, IQ, TC) for each of the 12 regular meridians on the left and right sides of the body.

The procedure for L% of BP calculation is as follows:

$$L\% (BP_a) = \frac{(BP_a)}{\frac{\sum_{x=1}^{28} BP_x}{28}}$$

← BP value of a particular meridian on the left side of the body

← Mean BP value: BP values summed over the 28 meridians (left and right sides) and divided by the total number of meridians (28 meridians)

Similarly for R% (BP_b):

$$R\% (BP_b) = \frac{(BP_b)}{\frac{\sum_{x=1}^{28} BP_x}{28}}$$

L% (R%) of each of the parameters AP, IQ and TC are calculated in an analogous fashion.

From Table A it can be seen that the magnitude of both L% and R% of BP seems to follow the same trend as the traditional order through which Ki energy is said (in Chinese medical theory) to circulate through the meridians: namely, lung meridian → large intestine → → gall bladder → liver. In contrast, however, L% (R%) of AP, IQ and TC do not seem to follow this order to the same degree.

Using the values of Table A, we rearranged the order of the meridians for each of the four parameters so that they were presented in increasing order of magnitude from left to right across the page. This was done for both L% and R% and generated Table B and Table C respectively. Table D was likewise generated from values of $(L\% + R\%)/2$. Having done this, some interesting observations became apparent.

Firstly, referring to Table B, for each of the 6 meridian pairs having a traditional Yin-Yang relationship, L% (BP) of Yin > L% (BP) of the corresponding Yang meridian. However, for L% of AP, IQ and TC there is no consistent relationship.

In Table C, R% (BP) of Yin meridian > R% (BP) of the corresponding Yang meridian except for the kidney-urinary bladder pair. In this case, R% (IQ) also displays this relationship, however, R% of AP and TC once again show no such Yin-Yang relationship.

In Table D, for $(L\% + R\%)/2$ of BP, once again the Yin meridian value > the corresponding Yang meridian value is displayed for each meridian pair. Furthermore, the parameters AP, IQ and TC show no clear analogous behavior.

In Table E, L% of BP and R% of BP derived from the AMI data of 29 clinical patients (Group 2) are arranged in ascending order from left to right. In this group, BP of Yin meridian > BP of the corresponding Yang meridian

Table D: (L + R)/2%

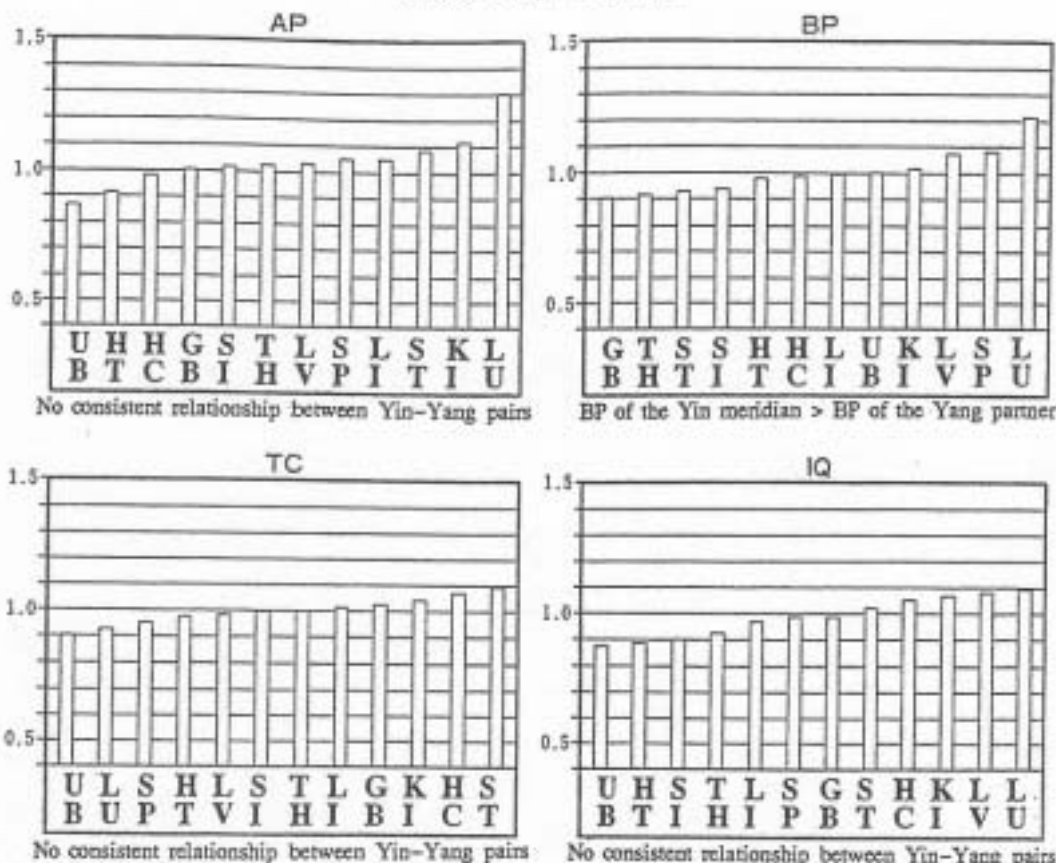
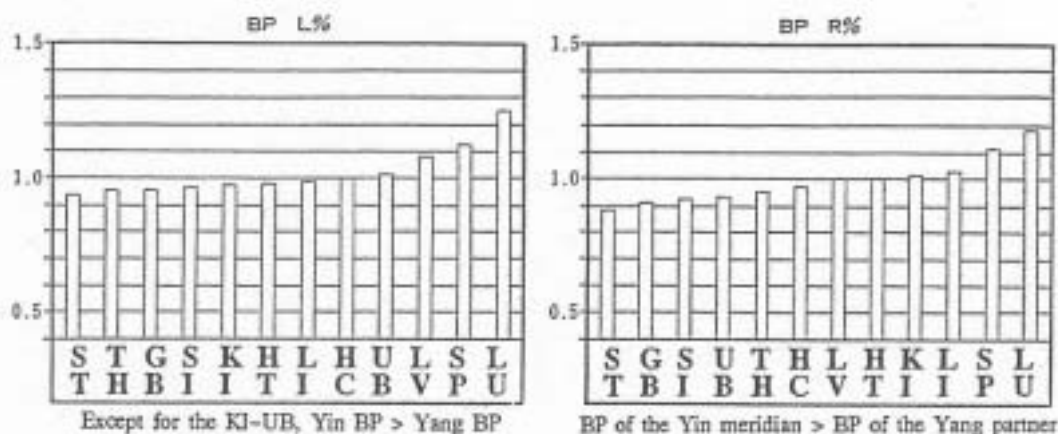


Table E: 29 Clinical Patients



was shown in L% & R% of all the Yin-Yang pairs, except L% of the kidney-urinary bladder pair, indicating the existence of Yin > Yang relationship.

In summary, it can be said that the above two sets of results (Groups 1 and 2, total 58 trials) indicate that BP alone reflects the tendency for Yin to be greater than Yang in each of the meridian pairs. This property therefore suggests that BP, which is known to be primarily a measure of the inherent electrical characteristics of the dermis, simultaneously reflects the condition of each acupuncture meridian and therefore its propensity for Ki energy flow.

(2) Yin-Yang Paired Meridians Which Show Yin > Yang

To confirm the Yin > Yang relationship observed in BP values, ① $(L\% + R\%)/2$ of BP, AP and IQ values for each meridian were calculated from the AMI data of about 30 subjects in each month for about one year, i.e., 344 measurement data from Nov. 1980 to Nov. 1981, ② the values were summed for each meridian for each month and the average values were calculated, and ③ Tables I1 - I12 were made to examine whether BP, AP and IQ values of each Yin-Yang paired meridians show Yin > Yang or Yang > Yin.

From these tables, the names of the months in which Yin > Yang is predominant and those of Yang > Yin were written in each BP, AP and IQ column, and thus Table H1 was made. The frequencies of Yin > Yang or Yang > Yin for 12 months were summed in Table H2, and χ^2 tests were performed to examine whether a significant difference exists in the frequencies of Yin > Yang and Yang > Yin in BP, AP and IQ values.

$\chi^2 = 37.55 > \chi^2_{.005} = 7.88$ in BP, $\chi^2 = 9.38 > \chi^2_{.005} = 7.88$ in AP, and $\chi^2 = 26.88 > \chi^2_{.005} = 7.88$ in IQ, were obtained.

In all BP, AP and IQ values, the frequency of Yin > Yang was significantly larger than that of Yang > Yin. However, the χ^2 value was 37.55 in BP value, which was the highest, followed by 26.88 in IQ value and then 9.38 in AP value. This indicates that the BP value is the parameter which predominantly shows Yin > Yang of the Yin-Yang paired meridians.

Table I1-1: Averages of L%+R%/2 in January

	BP (rank)	AP (rank)	IQ (rank)
LU	1.270 (1)	1.332 (1)	1.089 (5)
LI	0.973 (6)	0.929 (7)	0.898 (10)
ST	0.967 (7)	1.286 (2)	1.096 (3)
SP	1.059 (3)	1.109 (4)	1.178 (2)
HT	1.002 (4)	0.830 (10)	0.931 (8)
SI	0.881 (12)	0.646 (12)	0.653 (12)
UB	0.964 (8)	0.739 (11)	0.936 (7)
KI	1.002 (5)	1.079 (5)	1.095 (4)
HC	0.958 (9)	0.853 (9)	0.886 (11)
TH	0.931 (11)	1.048 (6)	0.918 (9)
GB	0.940 (10)	0.894 (8)	0.993 (6)
LV	1.083 (2)	1.204 (3)	1.205 (1)

Note: Averaged values from 30 subjects' data taken in Jan. 1981.

Table I1-2: Values Obtained Subtracting the Average of the Yang Meridian from That of the Yin Partner (in January)

	BP (rank)	AP (rank)	IQ (rank)
LU - LI	0.297 (1)	0.403 (1)	0.191 (3)
SP - ST	0.092 (4)	▲ 0.177 (5)	0.082 (5)
HI - SI	0.121 (3)	0.184 (4)	0.278 (1)
KI - UB	0.039 (5)	0.341 (2)	0.160 (4)
HC - TH	0.027 (6)	▲ 0.195 (6)	▲ 0.033 (6)
LV - GB	0.142 (2)	0.310 (3)	0.212 (2)

Note: Calculated from the averages of 30 subjects' data taken in Jan. 1981. ▲ shows Yang > Yin, and Yin > Yang is not marked. The minus values are indicated by "-".

Table I13-1: Averages of L%+R%/2 for the Year

	BP (rank)	AP (rank)	IQ (rank)
LU	1.216 (1)	1.191 (1)	0.967 (6)
LI	0.972 (7)	0.961 (7)	0.914 (10)
ST	0.964 (8)	1.145 (4)†	1.101 (4)
SP	1.088 (3)	1.098 (5)	1.248 (1)

HT	0.973 (6)	0.794 (11)	0.887 (11)
SI	0.912 (12)	0.776 (12)	0.703 (12)
UB	0.981 (5)	0.800 (10)	0.938 (8)
KI	0.992 (4)	1.170 (3)	1.138 (3)
HC	0.950 (9)	0.953 (8)	0.947 (7)
TH	0.947 (11)	0.991 (6)	0.936 (9)
GB	0.948 (10)	0.934 (9)	0.986 (5)
LV	1.091 (2)	1.190 (2)	1.227 (2)

Note: Averaged values from 344 subjects' data taken from Nov. 1980 to Nov. 1981.

Table I13-2: Values Obtained Subtracting the Average of the Yang Meridian from That of the Yin Partner (for the Year)

	BP (rank)	AP (rank)	IQ (rank)
LU - LI	0.245 (1)	0.230 (3)	0.053 (5)
SP - ST	0.124 (3)	▲ 0.047 (6)	0.147 (4)
HI - SI	0.061 (4)	0.019 (4)	0.184 (3)
KI - UB	0.012 (5)	0.370 (1)	0.200 (2)
HC - TH	0.003 (6)	▲ 0.038 (5)	0.012 (6)
LV - GB	0.143 (2)	0.256 (2)	0.241 (1)

Note: Calculated from the averages of 344 measurements' data taken from Nov. 1980 to Nov. 1981. ▲ shows Yang > Yin, and Yin > Yang is not marked. The minus values are indicated by "-".

Table H1: Months Which Showed Yin>Yang or Yang>Yin

	BP		AP		IQ	
	Yin > Yang	Yang > Yin	Yin > Yang	Yang > Yin	Yin > Yang	Yang > Yin
LU - LI	1 2 3 4 5 6 7 8 9 10 11 12		1 2 3 4 5 6 7 8 9 11 12	10	1 2 3 4 11 12 7 8 9 10	5 6
SP - ST	1 2 3 4 5 6 7 8 9 10 11 12		4 5 6 12	1 2 3 7 8 9 10 11	1 2 3 4 5 6 7 10 11 12	8 9
HI - SI	1 2 3 4 5 6 7 9 10 11 12	8	1 2 3 6 7 11 12	4 5 8 9 10	1 2 3 4 5 6 7 8 9 10 11 12	
KI - UB	1 2 3 4 7 9 10 12	5 6 8 11	1 2 3 4 5 6 7 8 9 10 11 12		1 2 3 4 5 6 7 8 9 10 11 12	
HC - TH	1 3 6 7 8 11 12	2 4 5 9 10	4 5 6 7	1 2 3 8 9 10 11 12	4 5 6 7 8 9	1 2 3 10 11 12
LV - GB	1 2 3 4 5 6 7 8 9 10 11 12		1 2 3 4 5 6 7 8 10 11 12	9	1 2 3 4 5 6 7 8 9 10 11 12	

Note: Made from 344 measurements' data for about one year from Nov. 1980 to Nov. 1981. Jan., Feb.,, Dec. were listed as 1, 2,, 12 in the above cells due to space limitation.

Table H2: Total Frequencies of Yin>Yang or Yang>Yin for Each Meridian Pair for 12 Months

	BP		AP		IQ	
	Yin > Yang	Yang > Yin	Yin > Yang	Yang > Yin	Yin > Yang	Yang > Yin
LU - LI	12		11	1	6	6
SP - ST	12		4	8	10	2
HI - SI	11	1	7	5	12	
KI - UB	8	4	12		12	
HC - TH	7	5	4	8	6	6
LV - GB	12		11	1	12	
Total	62	10	49	23	58	14

df = 1

BP $\chi^2 = 37.55 > \chi^2_{.005} = 7.88$ A significant differenceAP $\chi^2 = 9.38 > \chi^2_{.005} = 7.88$ A significant differenceIQ $\chi^2 = 26.88 > \chi^2_{.005} = 7.88$ A significant difference**Purposes:**

- ① To examine whether any significant difference exists between the frequencies of Yin > Yang and Yang > Yin in BP, AP and IQ values.
- ② To examine in which meridian the frequency of Yin > Yang is largest.
- ③ To examine in which meridian the frequency of Yang > Yin is largest.

Table H3: Total Frequencies of Yin>Yang or Yang>Yin for 12 Months

BP		AP		IQ	
Yin > Yang	Yang > Yin	Yin > Yang	Yang > Yin	Yin > Yang	Yang > Yin
62	10	49	23	58	14

Frequency of Yin > Yang df = 1

BP-AP $\chi^2 = 1.52 < \chi^2_{.05} = 3.84$ BP-IQ $\chi^2 = 0.13 < \chi^2_{.05} = 3.84$ IQ-AP $\chi^2 = 0.757 < \chi^2_{.05} = 3.84$

Frequency of Yang > Yin df = 1

BP-AP $\chi^2 = 5.12 > \chi^2_{.025} = 5.02$ A significant differenceBP-IQ $\chi^2 = 0.66 < \chi^2_{.05} = 3.84$ IQ-AP $\chi^2 = 2.18 < \chi^2_{.05} = 3.84$