Acupuncture Points Complex Networks in Human Body

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Abstract:

The therapeutic properties of the points of the fourteen meridians are generalized on the basis of the meridian is amenable to treatment. We constructed an acupuncture complex network of a portion of the body depending on different kinds of illness to figure out interactions between acupuncture points. We use 44 common illnesses such as common cold, headache as the portion to do the research. The constructed network contains a large component of 70 nodes out of 770 acupuncture points around the body.

An outline of the therapeutic properties of the points of the fourteen meridians

Acupuncture is an ancient Chinese therapy with its mode of action unclear and efficacy inconclusive (1-5). The therapeutic properties of the points of the fourteen meridians are generalized on the basis of the meridian is amenable to treatment. Each of the points has its own therapeutic feature owing to its particular location and pertaining meridian, Generally speaking, however, all the points can be used to treat disorders of the areas where they are located, and those adjacent to their location. These are known respectively as the local and adjacent points with therapeutic properties; In addition, some of the points can be used to treat disorders of the areas far away from where they are located. These are known as the remote or distal points with therapeutic properties (6).

1. The remote therapeutic properties of the points

The remote therapeutic properties of the points form a major regularity which established on the basis of the meridian theory. Among the points of the fourteen meridians, those located on the limbs, especially below the elbow and knee joints, are effective not only for the local disorders but also for disorders of the remote zang-fu organs and tissues on the course of their pertaining meridians. Some even have some systemic therapeutic properties.

2. The local and adjacent therapeutic properties of the points

All the points in the body share a common feature in terms of their therapeutic properties, namely, all have local and adjacent therapeutic properties. Each point located on a particular site is able to treat disorders of this area and of nearby organs. The therapeutic properties of the points on the head, face and truck are judged according to this principle, so are those of the points situated bilaterally along the above two extra meridians. Owing to the special distribution of the conception and governor vessels, their points have more systemic influence.

The remote, adjacent and local therapeutic property of these points are determined by how far away their effects reach from the location of points themselves. The therapeutic properties, remote, adjacent, or local points, are nevertheless characterized by function regulation. Clinical practice has proven that puncturing certain points may bring forth biphasic regulation on diversified functional abnormalities of the body. For instance, puncturing Neiguan corrects both tachycardia and bradycardia. In addition to the general therapeutic properties of some points, clinical attention should also be paid to the special therapeutic properties of some points.

All the points of a particular meridian are indicated in the disorders of that particular meridian. Points of the exteriorly-interiorly related meridians can be combined to treat disorders of those meridians. Neighboring points will have similar therapeutic properties. The therapeutic properties of the points on the limbs should be categorized meridian by meridian, those points of the head, face and truck, should be recognized in light of their locations.

Our research

Structural acupuncture networks can be explored using graph theory through the following step (see the figures):

• Define the network: Depending on 44 common illnesses, such as common cold, joint aches, liver complaints, high blood pressure, lower back pain, headache-forehead, and toothache, we found a total of 70 points out of 770 points that interacted with each other to form a complex network. In this complex network, each node represents a specific point. And the physical meaning of the links between the nodes means different acupuncture points co-effect on the same illness (7).
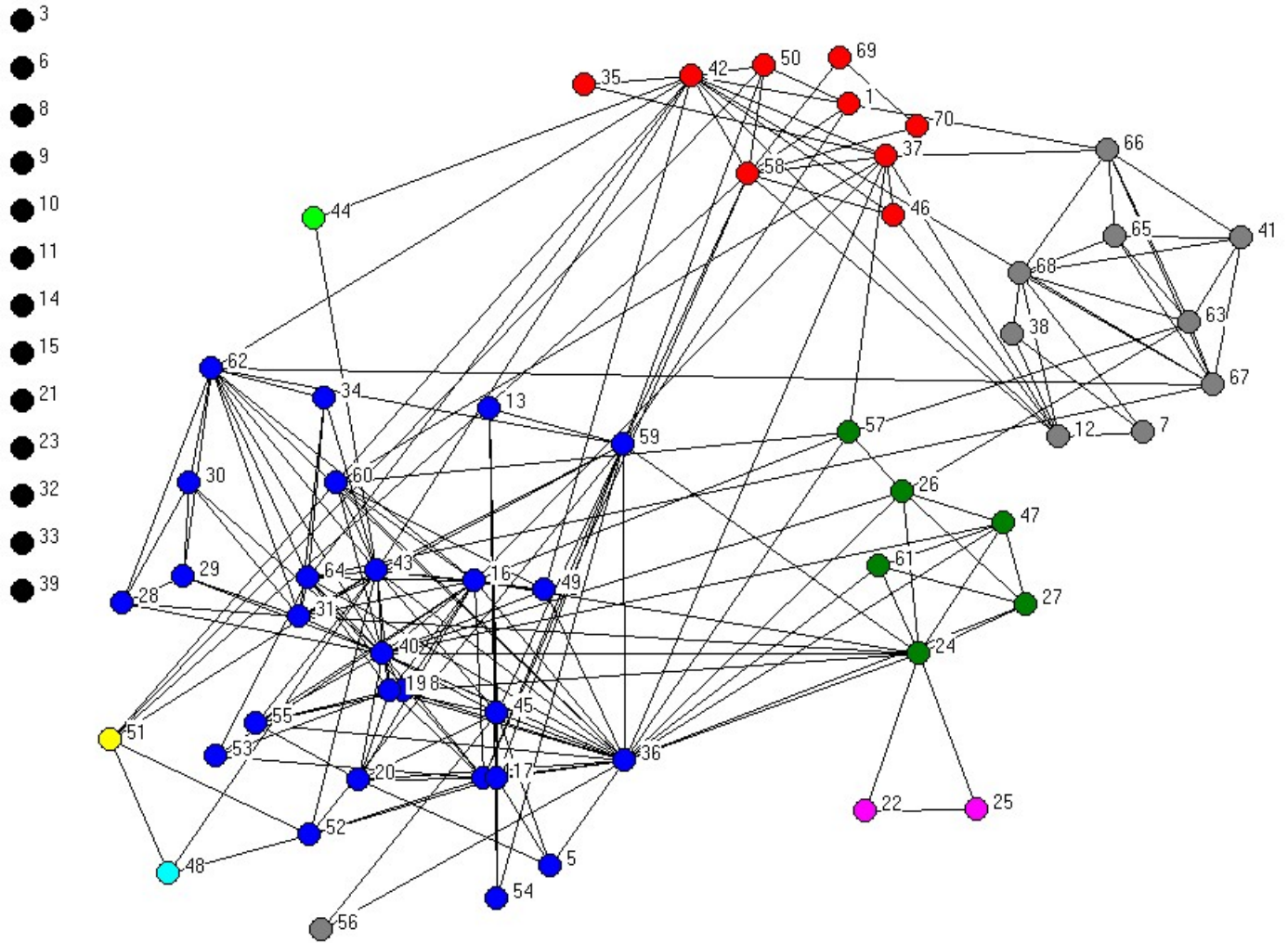
Figure1: Depending on 44 common illnesses, we found a total of 70 points out of 770 points around the body that interacted with each other to form a complex network. In this complex network, each node represents a specific point, each edge means the different points co-effect on the same illness.

Table 1: Depending on 44 common illnesses, we found a total of 70 points out of 770 points around the body that interacted with each other.

Respiratory Organs							
Common Cold	4	17	52	59			
Chronic Bronchitis	13	17	45	54	59		
Asthma	5	6	8	9	16	17	54
Circulatory System							
General Improvements	16	18	19	40	55		
Blood pressure too high	36	40	43	49	60		
Blood pressure too low	16	18	24	36			
Digestive System							

3

Ailing Stomach/duodenum	24	27	36	47	61	
Liver complaints	16	36	37	57	60	

Kidney and Bladder

Nighttime bedwetting	31	36	40	62	64	
Inflammations /Swelling	31	34	43	62	64	

Rheumatic Complaints

Joint aches	12	37	42	46	58	
Neck pains	42	50	51	58		
Shoulder pains	7	12	38	70		
Elbow pains	12	37	58			
Lower back pain	42	62	64	67		
Gout pains	42	63	65	66	67	70
Hip pains	37	42	66			
Knee pains	35	37	42			
Ankle pains	42	43	44			

Reproductive System

Menstrual problems	28	29	30	31	40	62
Climactic problems	2	16	19	53	64	

Imbalance Due to Stress or Emotion

Relieving the problems	16	19	20	36	40	55

Pain Relief

Headache – General	1	50	58	59		
Headache – Forehead	1	59				
Headache - Top of Head	42	49				
Headache – Temples	2	58				
Headache - Back of Head	42	50				
Toothache	43	59	62	A	B	
Dizziness	43	48	51	52		
Insomnia	16	19	40	43	55	
Hard-of-Hearing, Tinnitus	58	69	70			
Constipation	26	57	63			
Diarrhea	26	27	36	47		
Wind	24	26	40	47		
Nausea, vomiting	16	19	36			
Allergy, skin rash	16	36	40	49		
Fatigue	24	31	36	59		
Greater body efficiency	36	45	56			
Anxiety	16	19	36	40	43	
Sleepiness	19	40	43	45		
Sexual problems	16	31	36	40	43	62

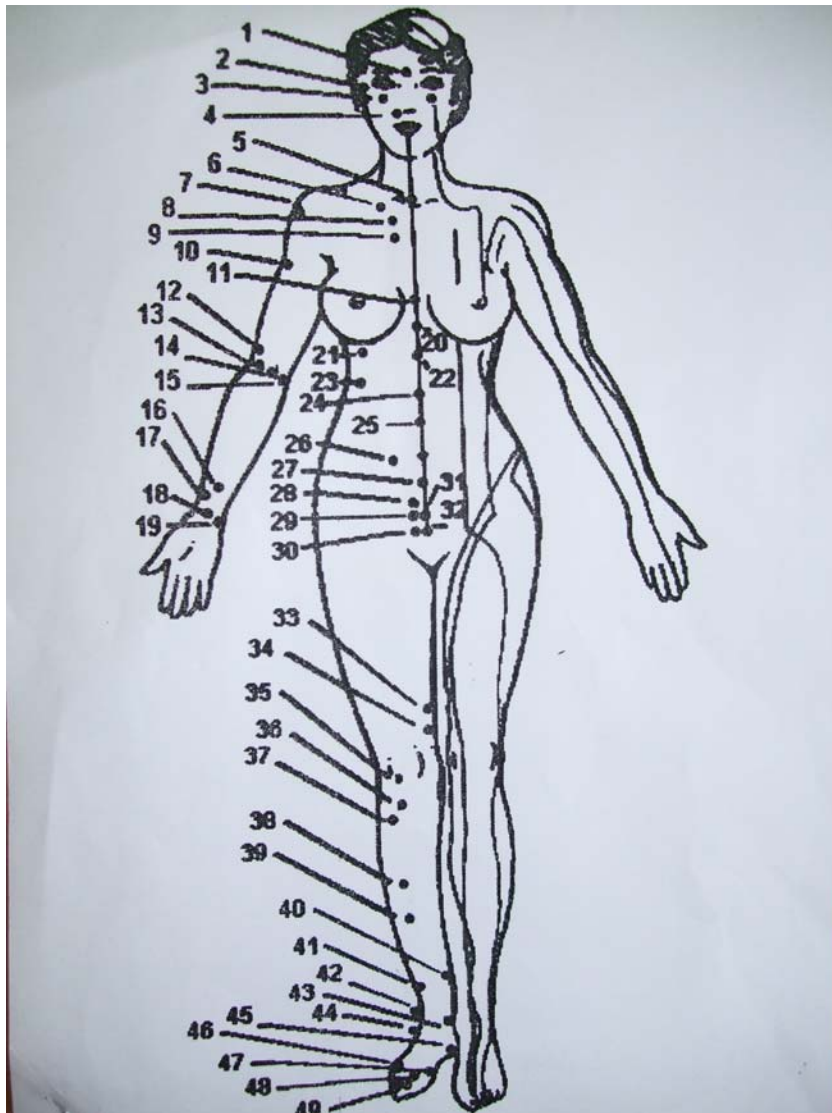|					
Breaking Bad Habits					
Lose weight	22	24	25	S	
Quit smoking	5	17	20	36	45
Quit drinking alcohol	4	16	19	36	40
General Health					
Face and body care	1	2	34	36	40

Fig2: 49 points out of 70 points could be labeled on body, another 21 points in the eight extra meridians we couldn't label them here.

Summary

We have constructed an acupuncture complex network of a portion of the human body depending on different kinds of illness to seek the interactions between acupuncture points. (Depending on some usual 44 illness, we found a total of 70 points out of 770 Acupuncture points around the body correlated and interacted)

We want to investigate the global dynamic properties and how the joint stimuli to acupunctures affect the health. With the use of a simple dynamical model, we want to find the body stationary state, to find the global attractor points of the dynamics. These results could suggest that the acupuncture points networks are robustly designed for their functions.

Acknowledgments:

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