

# THE EXTERNAL EAR — THE ELECTRICAL ASPECTS IN RELATION TO ACUPUNCTURE — A PRELIMINARY REPORT

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## INTRODUCTION

Acupuncture, a branch of Chinese traditional medicine, is believed to have originated in ancient China as early as before 2,000 B.C. (Veith, 1973). It now enjoys worldwide recognition and research in various aspects of acupuncture is presently being carried out in centres all over the world. Along with the growing use acupuncture among many physicians, new modalities were developed (Ling, Y.W., 1979) and notable among them, Auriculotherapy by Nogier (1950).

The great contribution by Dr. Nogier of France was his detailed mapping of the external ear of the projections of the various organs of the body (Fig. 1). The image of an inverted foetus is roughly represented in the external ear. Since then, there have been new topographical points discovered on the external ear to represent organs which were previously represented at different points, as illustrated in the ear acupuncture diagram (Fig. 2).

It has been generally assumed that acupuncture loci are d.c. (direct current) skin conductance maxima (resistance minima) (Frost & Orkin, 1973). Many workers who have utilised

various methods of measuring the current voltage characteristics of the skin have discovered that at the acupuncture points, the electrical skin resistance is lower than at the surrounding areas (Reichmanis *et al*: 1975 and Brown *et al*: 1974), particularly in diseased states of the corresponding organs that the acupuncture loci represent (Bergsmann and Woolley-Hart, 1973).

In view to the current revival of interest in acupuncture in Malaysia, we felt it appropriate to examine objectively the acupuncture system, placing special emphasis on its possible diagnostic value.

This study based on measuring the d.c. skin conductance of the acupuncture points of the external ear, was conducted in an attempt to test the efficacy of using the electrical aspects of the external ear as a tool in diagnosis.

## MATERIALS

The population under study comprises 2 groups of volunteers: 30 healthy controls of 16 males and 14 females with ages ranging from 20 to 45; and 20 patients with confirmed ischaemic heart disease, 18 males and 2 females with an age range of 29 to 66. The healthy volunteers were from medical students and University staff who have no complaints of any symptoms related to cardiac disorders nor were ever admitted to hospital for cardiac reasons. The cardiac patients were patients who had previously been admitted to the Coronary Care Unit, General Hospital, Kuala Lumpur for myocardial infarction, confirmed by electrocardiographic and enzyme changes, and are now on follow up treatment at the outpatient cardiac clinic at Universiti Kebangsaan Malaysia.

## METHOD

The device used to measure the current voltage characteristics of the acupuncture points of the external ear consisted of a hand held probe

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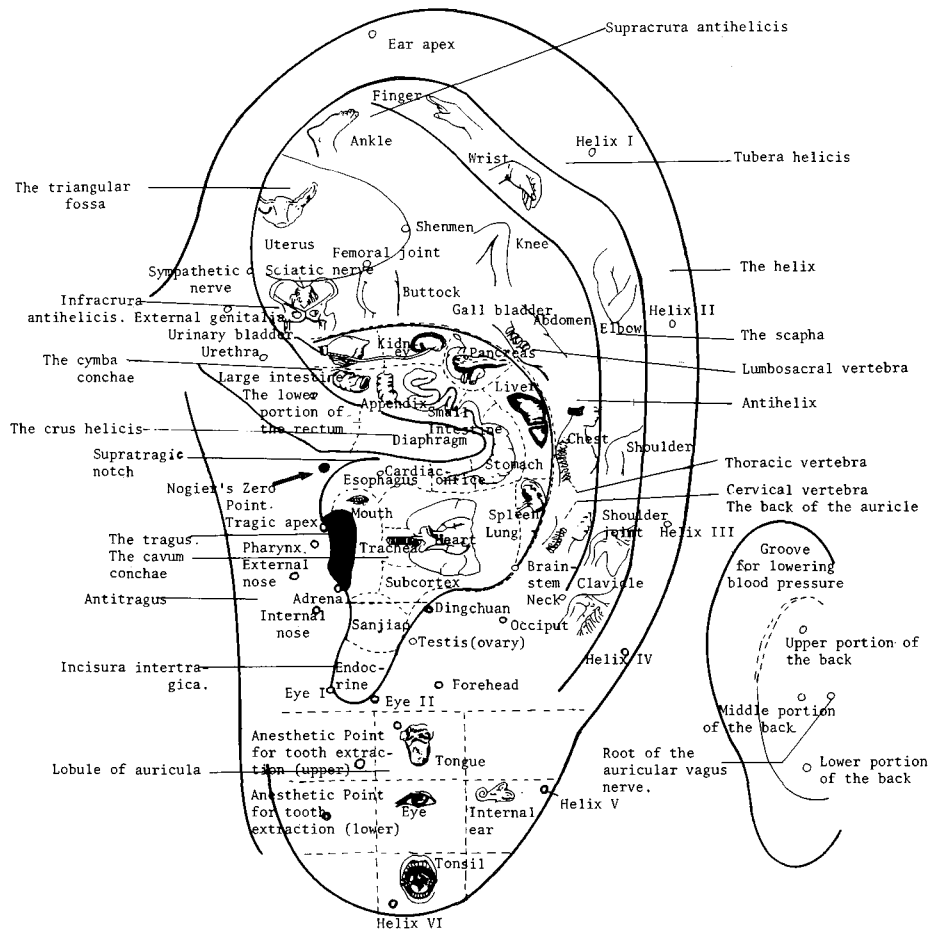


Fig. 1.

### The Corresponding Regional Anatomy Of The Auricular Points

connected to a 50  $\mu$  A full scale deflection microammeter, and the Chinese acupuncture machine (model WQ 10B). The probe is a stainless steel cylinder 10cm long and 2cm in diameter. The reference electrode is a stainless steel probe with the tip ending in a pinpoint. This was used to glide slowly over the external ear with a constant light pressure which did not distort the skin surface. The voltage applied is 5 volt biased by a 100K  $\Omega$  resistor and the current measured on the sensitive microammeter. The Chinese machine was used for counterchecking the result as it emits a sonic response at the affected points.

The skin of the auricle was not cleaned or treated prior to exploration as we did not know if

such procedures would affect the loci, although some workers (Reichmanis, Marino & Becker, 1976) cleaned the skin with alcohol first. As the probe moved across the various parts of the auricle, the pathological point(s) revealed itself by an abrupt drop in skin resistance which then produced a sudden deflection on the microammeter detector. We then noted the region of the body or organ that these points represented. We arbitrarily rejected any deflection that was not stable or was less than 10 A. We utilised the acupuncture points illustrated in Fig. 2, which showed two representative points of the heart; the old heart point is in the depth of the concha, while the new heart point is situated just medial to the tragus.

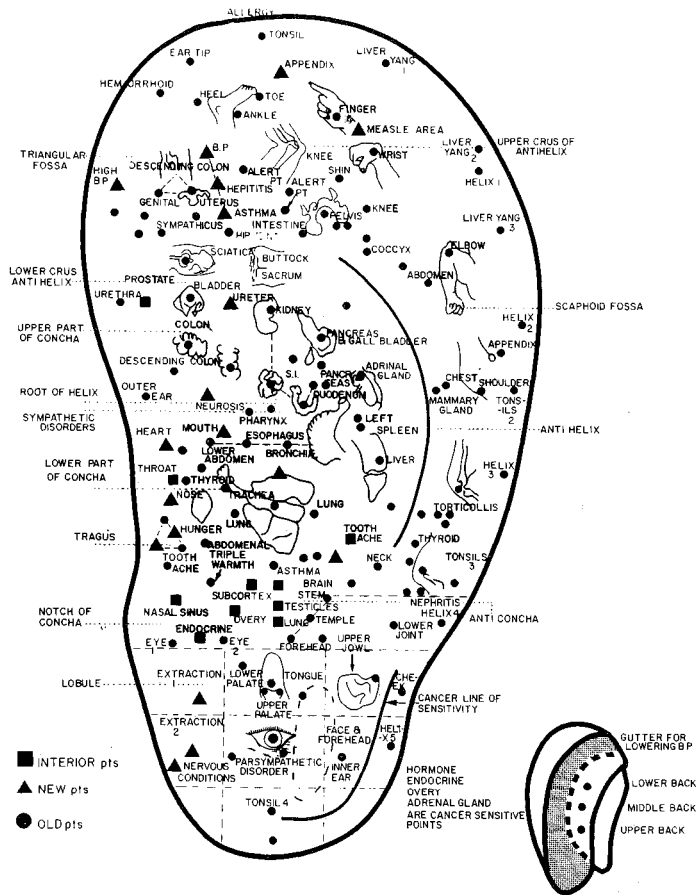


Fig. 2.  
Ear acupuncture chart

## RESULTS

We recorded it as a positive finding when a stable deflection  $10 \mu A$  or more was obtained at the acupuncture point representing the heart. We then compared the number of subjects with positive findings in the 2 groups.

The results showed that none of the healthy volunteers had any positive indicator deflection at the acupuncture points representing the heart while a considerable number, 19 out of 20 cardiac patients had positive indicator deflection at the same points. We consider this finding significant as it illustrates that at the heart acupuncture loci of the auricle of the cardiac patients, the bioelectric skin resistance was markedly decreased and this was recorded by the micro-

ammeter and the Chinese machine, thereby serving to confirm that the values of the electrical resistance of the skin vary according to the functional state of the organs with which the points are related. We do not know the reason for the negative result for one of the cardiac patients and we did not retest him as this is not consistent with our procedures, as the rest of the subjects were tested once only. However, we can only postulate that the negative response is due to the fact that at the auricular heart acupuncture point, the electric resistance is very high and is not picked up at all. Further it could be due to the fact that at the electrical resistance varies from one subject to another at the same time, and that the point may exhibit different values at different time of the day for the same subject.

## DISCUSSION

Skin resistance at acupuncture loci is reduced in relation to other regions, particularly in diseased state of the organs represented at these acupuncture points (Bergsmann and Woolley-Hart, 1973 and Ionescu-Tirgoviste, 1975). This observation also holds true for auricular acupuncture points (Kajdos, 1976). It has therefore been proposed to utilize the electrical properties of the acupuncture points for the diagnosis of the meridian affected in a determined disease, (Ionescu-Tirgoviste, Constantine and Bratu, 1974).

Electrical resistance of the skin may vary from one subject to another at the same points and Bratu (1959) stated that on diagnosing the affected meridians, account should be kept of comparative values of the points and not of absolute values. We therefore, have not used the absolute values of the current to calculate the skin resistance but have instead noted the indicator deflection brought about by the change in skin resistance along the tested points.

Our results showed that 95% of the cardiac patients demonstrated a marked stable deflection on the auricular acupuncture points that represented the heart while none of the healthy controls had any positive deflection at their corresponding points. From this, we can interpret that the lowered skin resistance of the auricular heart acupuncture point of the cardiac patients suggests an altered functional state or disorder of the cardiac status of these patients. We therefore feel that there is some credibility in believing that auricular electro acupuncture diagnosis holds some promise. In fact auricular diagnosis has been in practice since 1950 when Nogier introduced the new modality of auriculotherapy and gave us the detailed mapping of the external ear.

However we would like to mention some limitations associated with our present method of auricular diagnosis:-

1. At present we can only surmise that the representative organ has some disorder or

altered functional state and not make a diagnosis of a specific disease entity. We also cannot evaluate the degree of malfunction although we suspect that a higher and more marked deflection may indicate a more serious pathological disorder.

2. There are a lot of acupuncture points on the external ear and the exact position of any individual points is not easy to determine but we have attempted our best to locate them at their precise center and tried to minimise the danger of touching overlapping regions by making our reference probe tip a pin point.
3. The electrical skin resistance is affected by factors like temperature of the surroundings, sweat and dirt on the skin, and degree of pressure of the probe. We tested everyone in an air conditioned room to ensure a constant temperature and applied an even light pressure on the auricle throughout our testing.

Despite these limitations, however, we are satisfied with what our results have shown for the findings are consistent with what other workers have discovered in their work on the correlation of electrical skin resistance and acupuncture points, particularly in disordered states of the representative organs (Reichmanis, 1976 and Ionescu-Tirgoviste, 1975). The unique feature of this study is that we have used the auricle as our landmark of study while other workers have used the traditional points along the meridians in the other regions of the body (Reichmanis, Marino and Becker, 1975 and 1976). We also like to point out that this study support Dr. Nogier's experiment on auricular diagnosis, and Dr. Voll's long term studies (Vol. 1975) on electro acupuncture diagnosis and its efficacy as one of the modern diagnostic tools.

## SUMMARY

This study is based on measuring the d.c. (direct current) skin conductance of the acupuncture points representing the heart on the external ear. The subjects were 30 healthy volunteers and 20 cardiac patients. The results obtained showed

that the skin resistance of the heart acupuncture loci on the auricle of the cardiac patients were markedly reduced when compared with that of the healthy controls. The value of this method of auricular electroacupuncture diagnosis is discussed.

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