

# Magnetic Field Deficiency Syndrome and Magnetic Treatment

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## Preface

Almost 20 years have elapsed since we (Nakagawa, K., et al.) began research on "**Magnetism and Living Bodies**". Judging from the results of our research and those of other groups during this period, as well as from extensive referential data available

both in Japan and abroad, I have come to the belief that we assume the presence of what we call "The Magnetic Field Deficiency Syndrome" in human bodies. Hereinafter 'Magnetism' or 'Magnetic field' will imply a stationary state.

## I. Advocation of the Magnetic Field Deficiency Syndrome

Many clinical studies have proven that, among human illness syndromes, there is one which improves when magnetic fields are applied to a part of the human body (details given in article III).

**Considering:** 1. Facts gained from clinical studies, 2. The decreasing strength of the Earth's magnetic field and 3. The relationship between the human body and magnetism, I am of the following belief.

The human body is under the influence of the Earth's magnetic field and is keeping some sort of balance relationship with it. However, under modern day living conditions, the effect of this field has decreased. Consequently, we can assume that for a certain human body, this lack of magnetism has caused some abnormalities. For this reason, by the

external application of a magnetic field to the human body to supplement this deficiency, such abnormal conditions can be improved. In other words, I feel that there is a direct relationship between the decrease in the earth's magnetic field acting on the human body and the improvement of abnormal conditions of the human body by the application of magnetic fields.

This is my reason for advocating the presence of the magnetic field deficiency syndrome in living bodies. It is not clear if a similar syndrome occurs in living bodies other than human beings. However, as from the clinical point of view I believe we can safely say that the syndrome does exist in human bodies, I refer hereafter to those only.

## II. Clinical Image of the Syndrome

The symptoms of the syndrome are; "Stiffness" of the shoulders, back and scruff of the neck, uncertain lumbago, chest pains for no specific reason, habitual headache and heaviness of the head, dizziness and insomnia for uncertain reasons, habitual constipation, general lassitude, etc.

Generally speaking, the specific cause of the illness is not noticeable or no specific relationship between the original illness and the derivative symptoms can be found. The symptoms neither improve nor get worse, no clue being gained from clinical examination. One or more of the above symptoms is usually noticed as the syndrome.

Among those above-mentioned, there are, of course, some symptoms which accompany such

illnesses as hypertension, diabetes, disease of the digestive organs, bone and nerve diseases, etc. However, as with the syndrome such symptoms continue even after the original disease has been treated or cured, any relationship between such symptoms and the original disease can be excluded.

In other words, it is a syndrome in which no objective pathological findings can be noticed from routine physical and clinical examinations, but in which the subjective symptoms persist and are hard to improve, resisting various treatments but responding to the application of a magnetic field. An unbalance autonomic nervous system or part of such might be included in this syndrome.

## III. Basis for the presence of the Deficiency Syndrome

Here, I wish to discuss the basis of the magnetic field deficiency syndrome. *Firstly* whether the application of a magnetic field to the human body is effective in improving such symptoms as mentioned in II, and *secondly* whether the magnetic field acting on the human body today is really in a deficient condition or not.

### 1. Treatment by application of a magnetic field to the human body

Here I will deal with the cure of illnesses or improvement of symptoms by the use of a magnetic field. This is usually called magnetotherapy, and I will break it into two groups- research in Japan, and research abroad.

## (a) Research in Japan

During 1958 we (1-7), as part of the research on "Magnetism and Living Bodies", published the results of tests conducted to relieve stiffness of the shoulders. A reasonably high rate of success was achieved by having participants wear ferrite permanent magnet bands in the form of bracelets. The details of the tests were reported (6)(7) to the first symposium, Fujimoto(8) also reported finding the same magnetic bracelet effective in treating stiffness of the shoulders. Furthermore, Kimura et al. (7)(8) reported that by using two types of magnetic bracelets having surface flux densities of 470 gauss, improvement of subjective symptoms but no change in blood serum fat, blood serum protein and their fractions were noticed. Also, Nambu et al. (7) under the guidance of Kimura, by having 1,163 magnetic bracelets and for comparison 644 non-magnetized bracelets worn to treat stiffness of the shoulders, found a considerable difference between the two groups. Using hospitalized patients we (7) also tested foam rubber mattresses containing ferrite permanent magnets, reporting that improvement of subjective symptoms but no change in clinical tests was found. Tomizuka et al.(9)(10)(11), also reported finding magnetic fields effective in treating various diseases.

In 1974, we (12-15) distributed questionnaire sheets with patch-on-the-skin type magneto-therapeutic devices used to treat subjective symptoms. By dividing the 11,648 cases into four groups and investigating from there, an over 90% effective rate was gained with a confidence coefficient of 99%, this being subsequently reported. Furthermore, we (13) reported an 82.1-96.3% effective rate at confidence coefficient 99% over a group of 120 cases using rare earth cobalt magnetic necklaces having a surface magnetic flux density of 1300 gauss. Also, we reported that at confidence coefficient 99%, no ill effects on the human body were noticed in various clinical examinations performed on the participants both before and after the two-week test period.

Horie(16), in 1976 reported that in clinical tests of the magnetic ring, at the confidence coefficient 95% an effective rate of 76.3-97.3% was gained in treating stiffness of the shoulders. Using a blind test, he also found a considerable difference between magnetized and non-magnetized rings. Shimohira et al.(17) also tested the same magnetic ring in treating stiffness of the shoulders, finding that magnetized rings showed an 80.2% effective rate while non-magnetized rings showed a 6.3% effective rate.

We (18), and Takahashi et al. (19) also reported a high rate of effectiveness in treating stiffness of the

shoulders by using a magnetic necklace with a surface flux density of 700-900 gauss. At the same time, no ill effects on the human body could be found through clinical tests.

In 1975, Ohta (20) reported that following four weeks usage, magnetized necklaces showed an effective rate of 65% while non-magnetized necklaces showed only 20%. Baba (68) also conducted research using the same necklace as Ohta, finding it effective in 14 out of 20 cases. Sugiura(14) also reported a noticeable difference between the effective rate of magnetized and non-magnetized necklaces, 78% and 17% respectively. Shimada(15) also used the same necklace in treating stiffness of the shoulders, the first week using a magnetized necklace, the second week a non-magnetized necklace and the third week the magnetized necklace again. The magnetic necklace showed an effective rate of 75% while the non-magnetic necklace showed only 24%.

In 1976 Yamada et al (23) compared therapeutic effects of the magnetic necklace having a surface flux density of 1,300 gauss with another of 200 gauss by means of a blind test. Statistically, they noticed that the former was significantly more effective than the latter, and that both showed no disadvantageous side effects from the results of various clinical examinations.

## (b) Research Abroad

Magneto-therapy has a long history abroad, and the titles with a brief explanation of literature from past days are listed in the Bibliography of the Biological Effects of Magnetic Fields(24).

In this publication, We find the thesis Eydam I. of 1843 on the application of a magnetic field to the human body for therapeutic purposes. I believe I can say that with the exception of Paracelsus(25) or Gilbert(26) this is the oldest thesis on magneto-therapy. Following this in 1969, Maggiorani(27) reported that he gained effective and non-effective results in applying magnetism to the human body and that hysteria, ataxia and diabetes patients were most sensitive.

In 1878, Charot and Renard(27) wrote of the effects of magnetism on hysteria and in 1879 Mueller(27) wrote that itchiness and pain were noticed when a magnetic field was applied to the human body. Westphal(27) and Gangee(27) reported in 1878 of abnormal skin feeling returning to normal on the application of magnetism. In the same year, Waldmann(28) announced his thesis on "Der Magnetismus in der Heilkunde". This was probably the first thesis concerning the application of a magnetic

field to the treatment of illnesses. In 1879, Benedict(27) and Drosdov (27) reported that the application of a magnetic field reduced pain stemming from various causes. A thesis forwarded by Benedict, M. (29) in 1885 used the word Magneto-therapie, and in 1886 Quinan, J.R. (24)(30) announced a general history of the application of magnetism in medical science.

As mentioned above, much interest was shown in the relationship between the magnetic field and the human body and it is thought that magnetism was actually used in clinical medicine as treatment.

However, the application of magnetic fields in medicine had gradually faded, probably because of reports such as that of Peterson, F. and A.E. Kennelly(31) of the then influential Edison Laboratory who advocated that magnetism had no effect on the human body, and that of Hermann, L.(31) who reported finding no change in experiments using human beings and frogs.

In 1902, Kurella, H.(24) published a report on treatment using magnetism, and Kuehn, W.(24) made public another on Heilmagnetismus. Also in 1902, Fere, C.(24) made public a report on the effect of magnetism on human physiological functions. Following that, under the title of "Heilmagnetismus", Moll, A.(24) forwarded his thesis on magneto-therapy. Payr, E.(24) in 1915 also wrote a thesis on the application of strong electromagnets in the medical field, and Kahame, M.(24) forwarded a thesis titled Magnetotherapie.

As the above mentioned theses from abroad are very old, they are difficult to get in Japan and we have never read the originals only knowing them indirectly. However, judging from the titles of the theses, I believe we can safely presume magneto-therapy was tried and that it had quite a long history.

Following this, during the 1920's, as far as I can ascertain only a few theses on magneto-therapy were forwarded. However, in 1928, Rosenberg(27) stated that "We must admit that until now no basis for acknowledging the effect of a constant magnetic field has been obtained." This appeared to become the established theory in western countries, and also appears to have been accepted in Japan. I believe it was because of this that research on magnetism in the medical and biological fields was deemed meaningless.

In 1938, Hansen, K.M.(32) reported that patients suffering from subjective symptoms of sciatica, lumbago, joint pains, etc. but showing no findings in an X-ray examination, found relief when the constant field from an electromagnet was applied.

The report further stated that magnetism was also effective in treating acute inflammatory illnesses and chronic gingivitis. It does not give the strength of the field used, but we can assume it to be quite strong. With this therapy, the S-pole was applied to the body for periods of 10-40 minutes, this being repeated several or in some cases over 10 times.

Hansen, in 1944(33) and 1949(34) also forwarded her research on magnetic fields applied to the human body, but as this has no direct relationship to therapy I will not elaborate here. She states that from those studies it is found that magnetism applied to the human body functions mainly on the autonomic nervous system.

During the 1950's, research on the removal of strongly magnetic objects from the human body was made (35)(36), but as this also does not fall into the category of magneto-therapy I will not elaborate.

In 1960, Freeman, M.W.(37) forwarded his thesis on "Magnetism in Medicine", however this also does not deal with the therapeutic effects of magnetism. Sinkarera, L.F. et al.(38) reported in 1970 that a constant magnetic field was found effective in treating inflammatory illnesses of the female genital organs.

In 1972, Degan, I.L.(39) experimented with applying a constant magnetic field of 450-530 gauss to the hands of patients suffering from Dupuytren's contracture incurable by drugs. The treatment lasted for 15-40 minutes at a time, this being repeated from 5-40 times depending on the case. The treatment was found effective on first-degree symptoms, and also considerable improvement was noticed as well in cases with second degree symptoms.

## 2. Deficiency of the Magnetic Field acting on the human body

The earth's magnetic field is of course a stationary magnetic field working constantly on the human body. For this reason, I wish to discuss here whether this field is actually in a deficient state or not. Kawai(40) stated that the strength of the earth's field has decreased a total of 50% during the last 500 years, decreasing 5% over the past 100 years. Furthermore, it is said(41) that the total moment of the earth's magnetic field has been decreasing at the rate of 0.05% per year. Along these lines, Rikitake(42) also states that the magnetic moment of the earth is decreasing quite rapidly, the rate of decrease having reached about 5% per one hundred years. He maintains that if this continues the earth's

magnetic field will eventually reach zero in 200 years. Along with this decrease, the angles of the earth's magnetic field are also said to be changing.

It seems certain we can assume that the earth's magnetic field is decreasing in strength, and we can well imagine that this could be the cause of disorder in the human body.

Furthermore, we also consider that there are other factors as well, which could play a part in decreasing the effect of the earth's field acting on the human body.

Living or working in steel frame or steel structure buildings is one of these. Iron is several hundred to several thousand times more permeable than air(43), and so can absorb a large part of the magnetic lines of the earth's field thus sheltering people from such. Automobiles, electric trains, and ships are, to some extent, also sheltered places, the latter being especially so.

To confirm this point, it is necessary to actually measure the field strength on the spot, and we are at the moment preparing to do this. However, the actual process of measurement seems to be very difficult(42).

As the human race has long been under the influence of the earth's magnetic field I believe, as I mentioned before(7), that any change in this field could cause disorder in the human body. Kawai's book (40) is subtitled "The Earth's Magnetic Field Controls the Weather", and if this is really the situation, the human body will be influenced by this change in the weather. This can be shown as follows: Change in the earth's magnetic field leads to

a change in the weather which leads to an influence on the human body and consequent disorder of some kind.

However, even if the disorder in the human body occurs along these lines, it does not fall into the category we claim to be the Magnetic Field Deficiency Syndrome. The reason for this is that such a disorder would be caused indirectly by the change in the weather, and there would be no change in such a disorder which could be gained by applying a magnetic field directly to the human body.

We are left with the question of how magnetic fields (including the earth's field) directly affect the human body, and I wish to take this up in the next article.

There is a difference between each human body, and one such case could be suffering from a magnetic field deficiency even if there was no decrease in the strength of the earth's field. However, the people with the stated above show improvement when a magnetic field is applied, and we believe that at least with these people, there is a magnetic field deficiency.

To summarize, the earth's magnetic field acting on the human body has, for various reasons, been decreasing and this is believed to cause some sort of disorder in the human body. Therefore, when by some method a magnetic field is applied to the human body it is clear that the symptoms can be improved (see referential literature quoted), and this is the basis for our advocating the presence of the magnetic field deficiency syndrome.

## IV. The Relationship Between Magnetic Fields and the Human Body

Research on magnetic fields and the living body has become very active in recent years, much literature(57)(58)(67) having been published. In this article I wish, through items other than those concerning the treatment effects of magnetic fields which I discussed in article III, to discuss the relationship between magnetic fields and the human body. What I will take up here is concerned with the functional order of a magnetic field on the human body.

There has been some excellent research done on the objective effects of a magnetic field applied to the human body. One of these by Okai, et al.(44-47) confirmed by using animals that new electric current is generated by electromagnetic induction

when a magnetic field is applied to the blood stream. Then, by putting the human chest between the poles of an electromagnet or by generating a pulse between two poles placed as such, they detected, by using electrodes fixed to the skin, electromotive force by the blood flow across the magnetic field. They named this Magnetoheography. It was the first time the electric change occurring when a magnetic field is applied to the human body had been confirmed.

Similar studies utilizing animals were made during 1964, 1966 and 1969 by Beischer, et al.(48)(49)(58) with squirrel monkeys. That using a 100 kilogauss field from a super-conductive electromagnet showed a similar electromotive force as

in previous experiments on the human body. However, the experiment by Okai remains the first conducted on the human body.

From these experimental results, it is now clear that, in the case of both human beings and animals, electromotive force is generated by the external application of a magnetic field to the body. This phenomenon was first announced by Farbre, P. (1932)(50) and Kolin, A. (1936)(51) who studied the electromagnetic induction in living bodies by using the exposed blood vessels of animals. It is the phenomenon of a new electromagnetic flowmeter utilizing this phenomenon, this being applied in the fields of biology and experimental medicine to study circulation. The results of much research on this subject have been published, but as it is not the main theme of this thesis I will not quote details.

Since their time, the research of Farbre, P. and Kolin, A. has been adopted in the scope of physics, it being used to measure flow volume or flow speed in various fields(7). This branch of physics is called Magneto-hydrodynamics and publications by Alfven, H. (55) and Cowling, T.G. (56) are available on the subject.

Barnothy, M.F.(57) states that the electromotive force generated by this method creates Polarization Current and Conduction Current, these causing Electrolytic dissociation of body fluid which acts on the human body as stress.

It is clear that an electric change will occur when a magnetic field is applied to the human body, but this is not an insertion of electrical energy into the body; it is only a conversion of a part of the motion energy of the body fluid into electrical energy through the medium of a magnetic field. Therefore, we cannot consider it as an insertion of energy as the energy of the magnetic field is much smaller than other physical phenomena used for therapy today. For this reason, the function of a magnetic field on the human (living) body is helping only from the angle that it converts one particular form of energy which the system contains. We(7) believe it is a "physical, catalyst-like function".

For these reasons, we(7) feel that if such an energy change is produced by applying a magnetic field constantly to the human body, some change will occur in the body. To this effect, we believe that the therapeutic syndrome explained in II.

If this is the case, we must consider the mal-effects on the human body as the result of the application of such a field. This point will be covered in article VI.

Other phenomena which we feel could occur to the living (human) body when a magnetic field is ap-

plied to it are the Thermomagnetic effect and the Hall effect. (For details please refer to books specializing in this field). Barnothy, M.F.(57) also maintains that these effects occur, but to what extent they are important as a cause of the influence of a magnetic field on the human body has not been proven.

Furthermore, we could of course think of the molecular biological function as an explanation of the relationship between magnetic fields and the human body(57)(58), however, we(7) think that with the strength of the magnetic fields used for therapy today, we need not consider this. For this reason, I will not include an explanation of this.

Next, I wish to discuss the question of a magnetic field emanating from the human body. Whether or not there is such a field has already been confirmed, its presence being found using Magnetocardiography and Magnetoencephalography. Much research has been conducted on this phenomenon, but Tanaka and Ushio(59) summarize the point well. I will explain here the contents of this phenomenon.

A magnetic field, although weak, is formed around the human body by the active current within the body, this field changing as the active current changes. The purpose of Magnetocardiography and Magnetoencephalography is to record the change of this field from outside the body, and to utilize these findings for diagnosis. This recording is very difficult to make as an instrument which is capable of measuring to at least  $10^{-7}$  gauss is necessary for external recording, and above this noise prevention is also a problem. We are still testing the possibility but so far without success.

On the other hand, the earth's magnetic field has about a 0.5 gauss magnetic flux density, and is incomparably stronger than that emanating from the human body. Therefore, for even a small change in the earth's field that of the human body will be much affected. This may even affect the active current within the human body. Therefore, for even a small change in the earth's field that of the human body will be much affected. This may even affect the active current within the human body, and we can imagine that this could be the cause of disorder or change in the body.

When a magnetic field is applied externally to the human body, a field with a magnetic flux density of  $10^2$ - $10^3$  gauss can be easily and continuously maintained. Further, we can imagine that the magnetic field emanating from the body could be affected considerably. There are some theses(64) which claim that the influence on the magnetic field emanating from the human (living) body by an outside

field is the source of the function of fields on the body.

As the earth's magnetic field is to some extent always working on the body, and as the body fluid is always in motion even when the body is at rest, it must be that electromotive force is constantly being generated by electromagnetic induction. Also, when a man is in motion, he moves across the magnetic field and in the same way as a conductive material moving across a magnetic field it is also possible to consider that electromotive force could be generated.

## V. Treatment Effect Of Magnetism

An attempt to improve symptoms and treat illnesses by the application of a magnetic field to the human body is called magnetotherapy as mentioned in III.

### (A) Features of Magnetotherapy.

Most of the magnetotherapy cases mentioned in article III 1)b) employ an electromagnet, research done by Hansoen, K.M.(32)(33)(34) also employing such. For this reason, treatment consists of a series of applications each lasting for a maximum of 30-40 minutes. Contrary to this method, what we (7)(12-15) have been doing since 1957 is to apply a permanent magnet to the body for treatment, this making possible continuous treatment over a long period of time. Because of the recent remarkable development of magnetic flux density (max.  $3 \times 10^3$  gauss) to the human body.

We believe that the effectiveness of a magnetic field applied to the human body varies according to the following **six factors**:

1. Strength of the field
2. Uniformity of the field
3. Direction
4. Range of the field
5. Operational time
6. Position on the body to which the field is applied.

These points I have already detailed (7)(14)(15) and will not elaborate here. When the point of application of the magnetic field and the point where the effect is felt do not coincide, for example the use of the magnetic bracelets and rings to cure shoulder stiffness, this is referred to as the **Remote Effect** of the magnetic field. However, when the patch-on-

For these reasons, **the electromotive force generated when a man moves East-West and North-South will be different**, the speed of motion also causing a difference.

Summarizing what I have stated in this article and the contents of II, III, we assume the function of a magnetic field on the human body follows the steps shown in Fig. 1&2. However, there are many things still not clarified, but we believe that an approach to the solution both following and opposite to the direction of the arrows in Fig. 2. will lead to clarification of the problem(14)(15). I will not elaborate on this here.

the-skin type devices are directly applied to the area in which the symptoms are felt, the effect is referred to as the **Local Effect** of the magnetic field. We believe that magnetic fields can function in both ways.

Magnetic fields can be roughly divided into **two types**:

1. Stationary field;
2. Varying field:
  - Alternating
  - Pulsating
  - Rotating
  - Travelling fields.

Both in Japan and abroad, the influence exerted on living bodies by varying magnetic fields (mainly alternating and pulsating currents) has been studied. That treatment using varying magnetic fields is effective has been acknowledged and we have also been working with such. However, we are still not certain if it is helpful in treating the magnetic field deficiency syndrome or not, and for this reason I will not elaborate here.

There are present around us electro-magnetic waves and also stationary and varying magnetic fields emanating from various **electrical appliances**, but it is not certain what sort of relationship these magnetic fields have with the supply of magnetism to the human body.

### (B) Types of Magnetotherapeutic Devices and their Features.

In Japan, magnetotherapeutic devices are registered under the Drug Regulations Act of 1961 as No. 81

on the list covering Devices and Machines. This implementing of regulations to control the manufacture and sale of magnetotherapeutic devices happened three(1) years after we first reported on such devices to a medical congress, two years after the symposium on magnetism and the living body(6)(8) was held, and two years after we proposed the establishment of such regulations to the Minister of health and Welfare (according to my diary). Since that date, it has become legal to manufacture and sell magnetotherapeutic devices that have been officially approved.

Today, such devices as the magnetic wristband (bracelet), magnetic ring, magnetic stomach belt, magnetic mattress, magnetic necklace, magnetic arch plate, magnetic patch-on-skin device, etc., are being marketed. There are also some other types of devices available.

Generally, these magnetotherapeutic devices apply a stationary magnetic field to the human body, but the magnetic arch plate will cause the magnetic flux density to vary with each step when walking, this producing a varying magnetic field. Especially when permanent magnets are attached to the bottom of shoes or sandals, the factor working as a varying magnetic field can be large. Necklaces will swing with motion of the body, and this could also possibly produce the characteristics of a varying field. However, in the case of necklaces the stationary magnetic field factor is substantial, and this is believed to be helping to supply magnetism to the body.

We, in our routine medical practice, are using as a first choice suitable magnetotherapeutic devices as mentioned in II, and with such have been achieving quite high effective rates.

Magnetotherapeutic devices have the following features:

1. They can be easily used.
2. They can be used for long hours continuously.
3. The user can adjust the hours of usage to the subjective symptoms.
4. No serious side-effects can be found.

With the new magnetic materials which have been developed, the desired magnetic flux density can be achieved with a **small size**, and the users can wear them in the **same way as other costume jewelry or accessories**.

Regarding continuous usage, I wish to say the following. By using magnetotherapeutic devices, the symptoms described in II can be improved within one week in the majority of cases. However, if

usage is continued for two to six months, **the symptoms will sometimes return**. This, we believe, is caused by habituation in the human body, the same phenomenon being noticed with drugs. Therefore, once the symptoms disappear following use of the device, we suggest removal of such until the symptoms re-appear. By repetition of this procedure, the 'habituation' phenomenon can be prevented can be prevented and the device can be expected to remain effective over a long period of time.

Furthermore, we suggest that the user himself decide when he will wear the device, for example only at night or only during the day, etc. We suggest he wear it so that he feels the **least embarrassment while gaining the greatest effect**.

Regarding the magnetic flux density working on the body, Yamada et al.(23) report that from their studies magnetic necklaces with a surface flux density of 1,300 gauss showed a significantly greater therapeutic effect than those of only 200 gauss. We(60) also have compared the effectiveness of necklaces having a magnetic flux density of 700 gauss and 1,300 gauss, but found no significant difference from the point of view of effect. However, we did get the impression that the latter necklace required less time to take effect than the former. For this reason, I believe that to be suitably effective on the human body, a magnetic field with a flux density of over 500 gauss must be applied.

I believe that even with fields having a magnetic flux density of over 1,500 gauss, the only change will be that the necessary time of application will be shorter. This should be no problem as such time is easy to regulate.

Regarding **side-effects**, we could not detect **anything serious** but did have occasional reports of people feeling a **'rush of blood to the head'** or a **'dull-headed'** feeling. In our study(60), we had 4 out of 166 report such feelings. However, even with these people the stiffness in the shoulders was improved and I suggest that in such cases people accustom their bodies to the necklace by repeated intermittent usage of it.

As stated in III 1)a), no change disadvantageous to the human body could be found by the clinical tests. The reason for the presence of only very minor side effects is that as stated in IV magnetic fields only cause a conversion of energy within the system of an individual body, the actual input of energy being very small.

Regarding the pole of the magnet to be applied to the body, Davis, A.R. et al.(61) reported that the **S-pole has a soothing effect** while the **N-pole has an exciting effect**. However, there are no referential



quotations or data given to prove this point, and nothing is really clear. We did hold discussions with Davis, A.R. et al. in their laboratory in Florida, U.S.A. during a four-day stay there in 1972, but we could not receive data to back up the point and

could not agree with their idea. At the present stage, we believe that whether the N-pole or the S-pole is applied has no significant bearing on the effect of the treatment.

## VI. Magnetic Field Surplus Syndrome

To be brief, it is not confirmed at present whether a magnetic field Surplus Syndrome exists or not. As stated in V, some users have experienced a **rush of blood to the head**, etc., on use of magnetotherapeutic devices and this could be such a syndrome.

Regarding human bodies exposed to strong magnetic fields, Beischer, et al.(57) have tested a 20,000

gauss field, and from the results of this report that, with the exception of some cases of tooth-ache, no subjective symptoms were noticed when human beings were exposed to the field for a short time. We are also informed that people working within strong magnetic fields are in good health, and we plan to look into this point in the future.

## VII. Study

The human race, having been living on this earth, has been influenced by at least two physical phenomena- **gravity** and the **earth's magnetic field**. The relationship between gravity and the human body and, in relationship to recent space travel, the influence of a no-gravity condition on the human body have been the objects of research.

On the contrary, however, this is hardly true when it comes to the study of the earth's magnetic field on the human body. In the field of biology and field science, there has been some research done on the influence on test animals shielded from magnetic fields(58)(62), and during 1935-1976 research on the effects on the human body of being exposed to a very weak magnetic field for a ten day, one month and five year period of time was conducted(63). However, no reliable uniform information was forthcoming, and the relationship between the earth's magnetic field and the living body is still unclarified.

We are well aware that the following **definite steps** are needed **to confirm the magnetic field deficiency syndrome**:

1. For the human body to be kept in a test room shielded from all magnetic fields, but maintaining the same living conditions as people outside.
2. Research to be done to determine if the test subject in (1) shows any symptom as stated in II.

3. If such symptoms do occur, apply an external magnetic field to the body to see if there is any improvement or not.

If the results of these studies are all affirmative in nature, then the magnetic field deficiency syndrome can be established. However, as any such study is virtually impossible, I advocate the presence of the magnetic field deficiency syndrome on the basis of what I stated in III. As a result of our research starting from the therapeutic effects gained by artificially adding and applying magnetic fields to the human body, we have reached the above conclusion.

As Hansen, K.M.(34) stated in her report, the study of the relationship between magnetism and the living body as well as magnetotherapy was referred to in pre-1950 Europe as Magnetism = Mesmerism = Charlatanism. Because of this, when we first announced the results of our research in 1958, we were the objects of severe criticism and reproach(65)(66).

Some so-called 'people of authority' in Japan, have in the past made, through the media of mass communication, negative or careless statements about the impossibility of magnetic fields having an effect on the human body. None of these statements were based on their own study or referential literature. These statements caused much annoyance to us and to this field of research, but as there was no basis for these statements I will not quote them here but will leave it until some other opportunity.

## In Closing

I have stated here that we advocate the presence of the magnetic field deficiency syndrome, and also the basis for such a statement.

The reason for my daring to put pen to paper and write such a thesis as this at this time is that if research in this field will be taken up by many clinical doctors through actual application of this therapy, further data will be added to that available now and this will be established as a **new field of therapy**.

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What I have stated here about the therapeutic effects of magnetic fields is based on many study results, and I believe I can safely say that the contents of this report will not be contradicted at the present time. If, however, further studies are added to what I have stated, my belief might either be revised or supplemented in the future. However, I feel that when that happens, the total scope of the relationship between magnetic fields and the human body will have been clarified.

Dr. Masaie Horioka, Ex-director of The National Institute of Electricians.

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