DESIGN OF SYSTEM FOR THERAPY WITH RUNNING LOW FREQUENCY MAGNETIC FIELD

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Abstract

A visualisation of space configuration of low frequency static and running magnetic field is done in the paper. The requirements for design of system for running magnetic field in magneto-therapy is presented.. Some mechanical solutions for system for running magnetic field are described In the paper, also.

1. INTRODUCTION

The space configuration of low frequency magnetic field, created by two coils can be obtained using computer simulation. This simulation is on the base of appropriate algorithms [1,2]. A space configuration of a pair coils can be seen on fig.1. Different colors are used for different values of magnetic induction's module. The visualizations has been done for the values of magnetic induction's module from $1{,}07\,\mu T$ to $30{,}89\,mT$. The lines of magnetic induction in different points in the plane of axis Z are done by segments. The changes of the value and lines of magnetic induction between the two coils are too small. Therefore the magnetic field between two coils can be described as homogeny. The value of the coil in two inductors is $2\,A$.

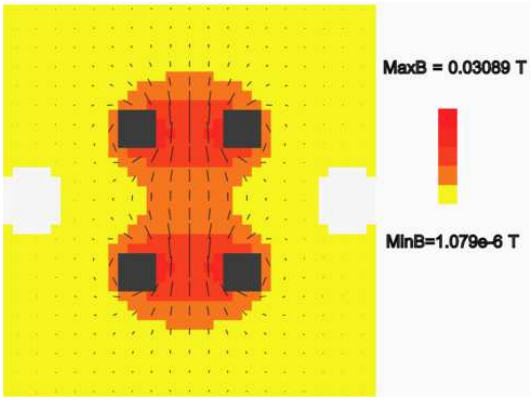

Fig. 1. Space configuration of low frequency magnetic field created by two coils

2. DESIGN OF THE BED FOR THERAPY BY RUNNING MAGNETIC FIELD

The method for computer simulation of space configuration of low frequency magnetic field of pair coils can be used for computer simulation of space configuration of magnetic field in the case of running magnetic field, also. In this case the coils can be as one or two sequences on the bed Fig. 2.

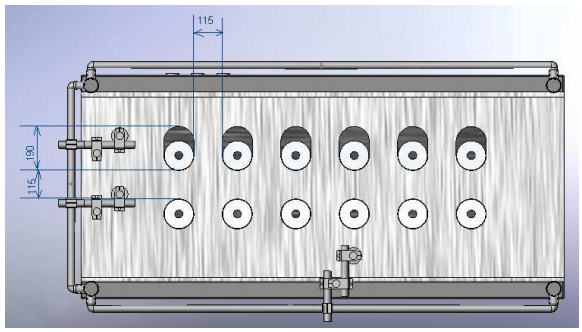

Fig. 2. The disposition of coils on the bed in the case of running magnetic field

The materials of the bed should be non magnetic. An appropriate plastic can be used. This plastic should has enough mechanical strong. For instance can be used material Polipa PA6. This materials has high mechanical hardness, high chemical steady, high steady for wear out, good skid, high electrical steady, good absorption of hits.

The patients should be recumbent on the coil's sequence on the bed. The mutual disposition of two sequence coils and patient's body can be seen on fig. 3.

On the patient's body should be one or two mobile coils depend of the number of coil's sequences. The coils on the bed should be on when they are under mobile coils.

The mechanical construction of system for running magnetic field can be seen on Fig. 4.

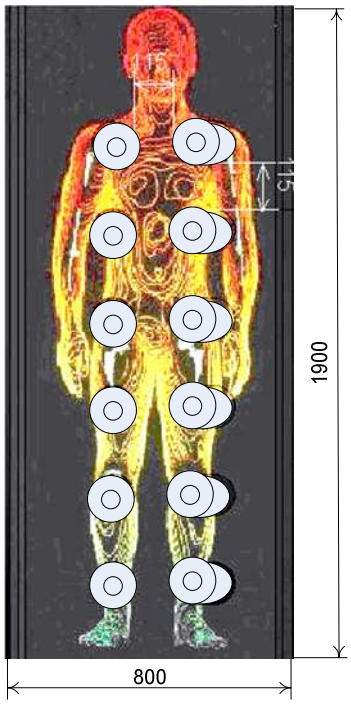

Fig. 3. Mutual disposition of two sequence coils and patient's body

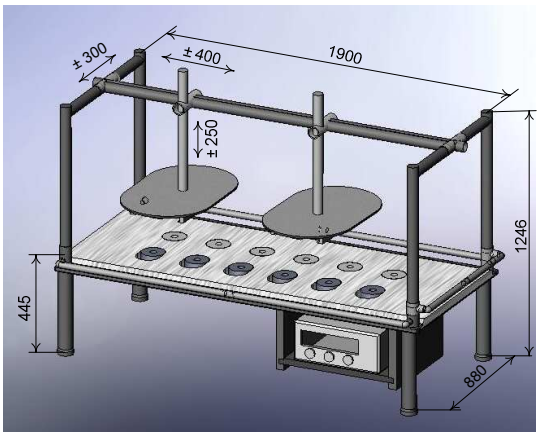

Fig. 4 Mechanical construction of system for running magnetic field

The "movement" of low frequency magnetic field can be obtained by mechanical running ob two mobile coils. The space distribution of the magnetic induction's module can be seen on fig. 5. if every pair of coils on the bed are on when they are under the mobile pair coils. The space distribution of magnetic induction's value of running magnetic field (fig. 5) has been done for different position of mobile coils.

Fig. 5a

Fig. 5b

Fig. 5c

Fig. 5d

Fig. 5e

Fig. 5. Space distribution of magnetic induction's value of running magnetic field

It's clear that the running magnetic field can be obtained not only by mechanical movement of two coils. It can be provided by electronic switching, also. In this case on the place of mobile coils should be situated the same two sequences of coils as these on the patient's bed. The all coils should be connected to the outputs of apparatus for magneto-therapy. In every moment only two pairs of coils should be on, one pair on the bed and one pair of "mobile" coils. The advantages of electronic switching of coils are clear. There are some disadvantages, also – the price of the system for running magnetic field will be increased because of increasing of number of coils, because of more complicated apparatus for magneto-therapy and because of more complicated mechanical construction.

The signals for the coils of running magnetic field can be created by apparatus for magnetotherapy (Fig. 6) All coils can be connected to the outputs of this apparatus.

Fig. 6. Apparatus for magneto-therapy

4. CONCLUSION

1. A computer simulation of space distribution of magnetic induction' values of pair coils depending of the value of electrical current have been donning in the paper.

2. A computer simulation of space distribution of magnetic induction' values in the case of running magnetic field are presented in the paper.

3. One mechanical construction of system for magneto-therapy with running magnetic field has been done.

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