



LOW COST METHOD FOR THERAPEUTIC ROLE PLANTAR INSOLES OBTAINING, USING RECYCLABLE MATERIALS

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Abstract: The paper presents a research through which it was proposed to develop a low cost method for obtaining a prototype of foot insole with double role. The first one is to stimulate selectively different nervous centers placed in the foot sole and the second is to correct casually any foot deformities like flat foot or hollow foot. The peculiarity of this case study is that for the prototype manufacturing it was proposed to use different materials, some of which to be cheap and/or recyclable. Another feature of the proposed model is that it must be designed and achieved so that, if necessary, all nerve centers or just some nervous centers in the soles can be stimulated. Besides, casually, to be able to include removable components designed to correct certain foot deformities, like flat foot or pronounced arch.

Keywords: insoles, nervous centers, prototype, materials

1. FOOT INSOLES - ACCESSORIES TO IMPROVE THE BODY FUNCTIONING

Methods that can stimulate different organs in the body have been continually developed in recent years by both doctors and therapists. That is why the methods of stimulating different nervous centers with correspondence to different internal or external organs have experienced a very strong scale [1], [2], [3].

On foot insoles, these could be very useful in terms of massage of the nervous centers on the sole. Generally their manufacturing is based on the maps of the reflex areas at the level of the sole (Figure 1) [4].

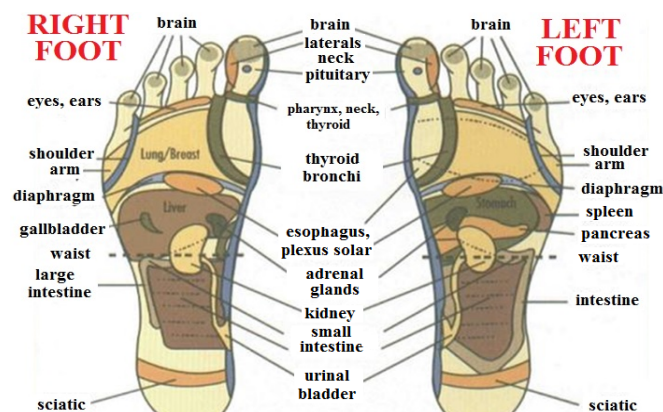


Figure 1: Map of reflex zones at the feet soles

Nowadays different foot insoles can be found on the market, with feet massage role, the most common being those manufactured from silicone materials, with magnetic balls inserted in areas corresponding to nervous terminals of the sole. Besides, in medical terms the role of dedicated plantation orts is increasingly recognized [5], [6], [7], [8].

2. DEVELOPED METHOD TO OBTAIN LOW COST FOOT INSOLES TO STIMULATE NERVE CENTERS

In the paper is described a stage of our research focused on developing a new method for manufacturing a prototype of low – cost double role foot insole. The first role is to correct any foot deformities (like flat feet or

pronounced arch), meaning to improve the body stability and balance when standing or walking [9]. The second role is to stimulate the proper functioning of the internal organs, via nervous centers on the foot sole massaging.

One of the prototype particularity consists in the fact that to achieve this prototype were used both low cost and recyclable materials, like silicone for sanitary installations recycled rubber, recycled sponge foil for parquet etc. The main prototyping item is represented by flexible silicone core, which was obtained by casting in a special mold. Another particularity is that the prototyped foot insole can be used either just having a role of nervous centers on foot massaging, either having double role (above described). This is explained by the fact that additional rubber or silicone items can be easily interposed or removed from the insole, as the situation. Moreover, in terms of stimulation, this can be done selectively, by disposing or removing, according to the preference of the elements with this role.

2.1. Stages of the prototype manufacturing

The first and the most important step was to make a plaster mold after the foot form of an adult male subject, aged 35 years, mold in which, after that holes, different form and size were practiced. They aim at obtaining the silicon core of some prominences with the role of massaging different nervous centers on the sole. Thus, in making the mold the holes disposing was performed according with the map of reflex zones, presented at Figure 1. The greatest attention has been paid for the heel, metatarsal and media areas.



Figure 1: Obtaining the silicone core

In order to have a selective role on nervous center foot sole stimulation, the next step was to divide the silicone core into three important items, one for each representative foot sole area (for metatarsal zone, for median zone and for heel zone) (Figure 2):



Figure 2: Silicone core dividing into three items specific for each plantar area

The next step consisted in disposing of a simple insole from a special sponge recycled material used for laminate flooring. Each item could be placed on the sponge layer due to some Velcro elements, allowing both disposing and removing the silicone items. An example is presented in Figure 3:



Figure 3: Example of disposing a silicone item (via Velcro elements) to the sponge layer
To increase the lifetime and resistance of the foot insole, and to increase the wearing comfort, another sponge layer (high density) was used as base for disposing to each silicone item (Figure 4):



Figure 4: Sponge high density elements disposing on the core silicone items, for wearing comfort increasing

The main advantage is that each sponge element can be easily disposed and removed from the silicone core, due to some Velcro elements for gripping (Figure 5). In this way it became possible to increase or to decrease the degree of nervous centers stimulating. In case of presence of high density sponge elements the stimulation degree is low, while in the absence of these, the stimulation becomes degree becomes high.

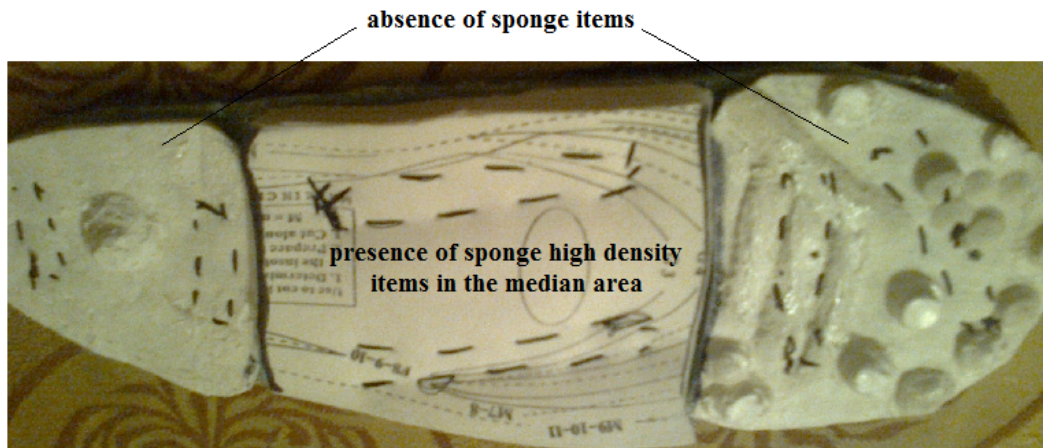


Figure 5: Example of selective removing of sponge items, for nervous terminals stimulation, corresponding to heel and metatarsal areas

The next step was to interpose a pocket containing several recycled rubber items for optional flat foot progressive correction. The pocket was disposed between the base and silicone core, in the median area, to be easy to be removed or interposed. Besides, inside the pocket, the rubber items can be one by one inserted as much as wish a step by step flat foot correction.

Finally, the last step was to adapt the entire foot insole prototype in a house slipper, which was later used through the house (Figure 6).



Figure 6: Adapting and disposing the foot insole prototype into a house slipper

3. CONCLUSION

The prototyped foot insole was wear by a male person, 37 years aged over a period of time of one week, every day being worn inside the right house slipper at least one hour. The foot insole conformation was so that it could stimulate the median plantar area to a greater extent (without sponge cover) and the metatarsal and heel areas to a lesser extent. It was observed a slight improvement in digestive function and a weight loss of about 2 kg, in keeping with the same lifestyle. For this reason it is envisaged to adapt the prototype also for different shoes. Another aspect to be considered is to improve the insole, by disposing inside the silicone core of small balls (that could provide from extremely used ball bearings) to improve the nervous centers stimulation.

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