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Coupling bellows for shockwave therapy

The present invention relates to a coupling bellows, as is e.g. known from German Utility Model 29712035 and used for coupling a shockwave source to the body of a patient.

In shockwave therapy an objectionable airborne sound, which is subjectively noticed as a loud "shot", is created with each shockwave.
This source of noise is considered by the patient and also by the treating personnel as a burden.

Said objectionable airborne sound is mainly emitted from the area of the coupling bellows that is not covered by the patient's body. It is prior art to provide additional noise-insulating material on the outer lateral surface of the coupling bellows, e.g. towels, small sand bags or specifically designed sound-insulating sleeves.

The known solutions have several drawbacks. On the one hand, they are difficult to handle and/or heavy; on the other hand, they present an obstacle in the locating of the concrement because they extend into the optical path of the X-ray device or the ultrasonic device.

It is the object of the present invention to provide a coupling bellows in the case of which less airborne sound is emitted without the locating of the concrement being restricted.

Said object is achieved through the characterizing features of claim 1.

The subclaims refer to developments and/or particularly advantageous designs of the invention.

The invention shall now be explained in more detail with reference to a figure.

Fig. 1 shows the coupling bellows 1 in a sectional view. Its construction is substantially in rotational symmetry with axis 2.
The coupling portion 3 that comes into contact with the patient is thin-walled and is without inclusions. The shockwaves are thus only absorbed to a minimum degree.

By contrast, the lateral outer portion 4 is designed for maximum sound absorption by way of air pores or other fillers.

The air pores have the additional advantage that the bellows becomes thereby more elastic and can adapt to the different penetration depths, of which each requires a different extension of the coupling bellows (along axis 2), in a better way than a homogeneous material without pores.

Ideally, the coupling bellows of the invention is produced in the so-called "compression molding" method. In this method one or more partly vulcanized mats that have been cut to size are inserted into a tool.
Under the action of pressure and temperature the blanks become paste-like to liquid, they connect to each other and cure completely.

According to the invention a material which develops pores during vulcanization/polymerization ("sponge rubber") is chosen for the outer portion 4, whereas the insertion part for the coupling portion 3 exhibits optimum shockwave and ultrasound transmission. Almost all elastomers, such as the large class of

rubber materials, are suited as materials and, apart from these, silicones and polyurethanes.

Patent Claims

1 A coupling bellows for coupling a shockwave source to the body of a patient, which bellows can be filled with a liquid or a gel,

- is made substantially rotationally symmetrical,
- comprises a portion which extends substantially perpendicular to the axis of rotation and is designed as a coupling surface relative to the patient's body, and
- an outer portion which extends substantially in cylindrical fashion relative to the axis of rotation,

characterized in that
said coupling portion (3) is made transmissive for shockwaves and said outer portion (4) is made sound-insulating.

2 The coupling bellows according to claim 1,
characterized in that
said coupling portion (3) is made thin-walled and free from inclusions, said outer portion (4) is made more thick-walled and provided with air pores and/or other sound-insulating fillers.

3. The coupling bellows according to claim 1 or 2,
characterized in that
said coupling portion (3) and said outer portion (4) are made from different materials that are however interconnected in a liquid-tight manner.

4. The coupling bellows according to claims 1 to 3,
characterized in that
the material used for the coupling portion (3) and the outer portion (4) can be vulcanized.

5. The coupling bellows according to claim 4,
characterized in that
the material used for the outer portion (4) has a porous structure after vulcanization.