

Dynamic Evaluation of working pressures with 'gorgurão' sleeves used in the treatment of lymphedema of the arm

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Abstract

The objective of the present study was to evaluate the working pressures at the interface between the skin and compression sleeves made of 'gorgurão' (cotton-polyester textile) used in the treatment of lymphedema of the arms.

Twenty measurements of working pressures between the skin and 'gorgurão' sleeves for each of five patients suffering from lymphedema of the arms were taken. For this evaluation, an apparatus developed by Godoy & Braile, which dynamically measures the working pressure at half-second intervals, was utilized. Two sensors were placed in the medial region of the biceps muscle.

In all evaluations, it was proved that resting pressures are recorded depending on the manner in which the sleeve is used and that the sleeves cause important variations in the working pressures.

In conclusion, low-elastic 'gorgurão' sleeves are an alternative method of compression in the treatment of lymphedema. **Key words:** Sleeves, dynamic evaluation, lymphedema, "gorgurão" textile.

Introduction

Lymphedema is a chronic disease characterized by an abnormal accumulation of liquids and other substances in the tissues resulting from a failure in drainage of the lymphatic system associated with proteolysis of the cellular interstice and mobilization of the macromolecules such as hyaluronic acid ⁽¹⁾. The degree of dysfunction is influenced by physical factors including joint mobility, a reduction in the amplitude of movements, the weight of the limb and pain that can cause inability to perform daily chores, whether at home, at work or during leisure activities.

Psychological aspects and the esthetic appearance of the limb negatively interfere in the quality of life of these patients ⁽²⁾.

Treatment aims at reducing and controlling the lymphedema, a functional improvement of the limb, the prevention of associated infections, providing independence for the patient in their daily life and improving the psychological and social situation of the patients ^(3,4).

Compression represents one of the most important forms of intervention in the treatment of lymphedema, assisting in the removal of excessive fluids as well as maintaining any achieved improvements in size. In these cases low-elastic materials are the most recommended ^(5,6) and can be compared to the action of aponeurosis ⁽⁵⁾.

One of the difficulties with bandages is their availability and the cost of the material, which sometimes limits treatment.

The objective of this study was to evaluate the working pressures between the skin and sleeves made from 'gorgurão', a cotton-polyester material in patients suffering from lymphedema of the arms.

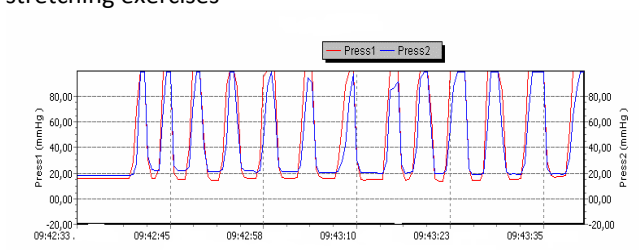
Method

Twenty measurements of working pressures between low-elastic sleeves and the skin were performed in dynamic and static studies on five patients with lymphedema of the upper limbs. The patients were aged between 43 and 72 years old. The sleeves were tailor-made specifically for the individual patients from 'gorgurão' a cotton-polyester material. Care is required in the manufacturing of the sleeves so that a good fit on the arm is achieved and thus each sleeve must be adapted to individual patients and work as an external limitation, similar to aponeurosis. To evaluate the working pressures, an apparatus developed by Godoy and Braille in the Braille Biomedica Company of São José do Rio Preto, Brazil was employed. The apparatus was programmed to assess the pressure variations at half-second intervals. Balloon catheters connected to sensors were placed in the medial region of the biceps muscle. The patients were requested to make slow flexion and stretching movements with the arm and numeric data were collected and stored.

Results

The 'gorgurão' sleeve caused pressure variations which varied depending on the positioning and adjustment of the sleeve and the type of muscle activity. In cases where the sleeves were not well adjusted and were loose, and thus did not exert compression forces, neither working nor resting pressures were detected. From the moment that the sleeves were readjusted giving positive resting pressures, working pressures were also detected. The flexion and stretching movements of the forearm are the most efficacious in generating working pressures as they cause greater variations, producing peaks of up to 80 mmHg (Graphic 1).

Graphic 1. Working pressure variations of a 'gorgurão' sleeve with the forearm performing flexion and stretching exercises



Discussion

The present study shows that sleeves made from the 'gorgurão' (cotton-polyester) material cause significant resting and working pressures. The resting pressure is a constant pressure on the arm, depending on the adjustment of the sleeve, and with the initiation of muscle activity the pressure variations, that is the working pressures, increase. The working pressures depend on the limitation imposed by the sleeves and on the forces imposed by muscle activities. The 'gorgurão' sleeve proved to be efficient in performing this function. Thus, this is an alternative form of contention in the treatment of lymphedema of the upper limbs. There seem to be no publications reporting on dynamic studies of stockings and sleeves using this methodology and we thus have no standards for comparison.

These sleeves are easy to adapt and adjust, have a low cost and are easy to make. Even so, they must be adapted on the limb like any other type of contention, mainly in respect to functionality in order to avoid transversal extension during activities. Patients should be counseled about the necessity of their continuous use specifically during everyday activities and with this serve as protection for the limb and/or as a form of treatment for lymphedema.

The 'gorgurão' material is used to manufacture clothes and is well tolerated by the skin (6).

These sleeves have been used to give a significant reduction of the limb even to a normal size. Conventional elastic sleeves can be associated according to the necessities of each individual patient.

Conclusion

Low-elastic 'gorgurão' sleeves are an alternative form of contention in the treatment of lymphedema. They cause pressure variations which are influenced by muscle activities.

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