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Design of Seamless Knitted Health Care Pants for Knee Arthritis Based on Grey Correlation Analysis

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Abstract

As a common disease in the elderly, the research on knee arthritis is mostly clinical treatment, but the research on functional health care pants for the daily health care of knee osteoarthritis patients is less. In view of this phenomenon, this paper explores the function of the health pants through the interviews of experts and the questionnaire survey of patients, and analyzes the weight of the function demand. Aiming at the five functional requirements with large weight, the fabric was screened, tested and analyzed by grey correlation degree. According to the analysis results, choose the fabric with better function and choose different tissues according to different parts, so as to design a kind of health care pants for knee arthritis to meet the needs of health care and comfort.

Keywords: Health Pants; Arthritis; Graphene; Seamless Knitting

1 Introduction

With growing ageing population, osteoarthritis is one of the major diseases threatening the health of the elderly, and the incidence has been increasing. According to the World Health Organization (WHO), the incidence of osteoarthritis in people over 55 years old has reached 80%, and knee osteoarthritis is one of the most vulnerable joints. As a chronic joint disease, osteoarthritis has complex pathological characteristics and causes, and it is difficult for patients to cure completely, so it has been bothering the life and work of the majority of patients. In osteoarthritis, knee arthritis accounts for a large proportion.

In recent years, seamless knitted fabric has been widely used in the field of health clothing because of its comfort, body shaping, beauty and better warmth retention. Therefore, seamless knitting technology applied to the production of arthritis health pants can effectively improve its heat preservation effect. However, at present, the seamless knitted fabrics in the market generally use some common materials, and the use of functional fibers is less, so it is difficult to meet the functional requirements of clothing fabrics [1]. Aiming at this problem, this paper selects the

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current functional yarn and tissue, and carries out the corresponding functional experiments, and selects the yarn and tissue with better functional effect for the design of health pants.

2 Expert Interview and Questionnaire Survey

2.1 Expert interview

In order to explore the functional requirements of knee osteoarthritis health care pants, this topic interviewed a traditional Chinese medicine and a western medicine. From the two aspects of traditional Chinese medicine and Western medicine, we interviewed about the treatment of knee osteoarthritis, the functions of knee joint health care pants and the suggestions for improvement of knee joint health care pants. From the perspective of Western medicine, the treatment focuses on pain alleviation, inflammation elimination and other aspects, mostly drug treatment. For the function of knee arthritis health care pants, it pays more attention to its far-infrared and warmth preservation. From the perspective of traditional Chinese medicine, traditional Chinese medicine believes that the onset of arthritis is not only related to joint injury, but also to the humidity and cold degree of the body and external environment. Therefore, in addition to the far-infrared and warmth retention required by western medicine, good moisture absorption and permeability are also needed.

Based on the results of experts' interviews on pathology and current health care pants, 12 dimensional indexes of health care pants are summarized, which are far infrared, hygroscopicity, permeability, moisture permeability, heat preservation, wear resistance, anti pilling and pilling, wrinkle recovery, antistatic, thickness, ease of wearing and taking off, and overall beauty. In order to obtain the weight relationship of these 12 indexes, this questionnaire survey is carried out .

2.2 Consumer Survey

In order to understand consumers' demand for different functions of knee joint health pants, a questionnaire survey was conducted on 12 indicators proposed by experts. A total of 134 patients with different degrees of knee arthritis were investigated by questionnaire, including 86 mild patients (walking steadily, occasional pain near the knee), 41 moderate patients (walking steadily, occasional pain at the knee), and 7 severe patients (walking unsteadily, frequent pain at the knee). The 12 indicators are scored through network and manual field distribution. Each indicator is set with 5 options, including no need, little need, general, need and very need, with 1-5 points respectively.

2.3 Questionnaire Result and Analysis

Principal Component Analysis (PCA) is used to determine the weight of the index. The greater the weight, the higher the importance of the index and the greater the impact on the whole [2].

Table 1 is a KOM test for the suitability of data for principal component analysis. Among them, when KOM value is greater than 0.9, 0.9-0.8 is more suitable, 0.8-0.7 is general, and less than 0.7 is not suitable for data [3]. According to the value of KMO in Table 1 is 0.961, it shows