



Exercise Resisted in the Rehabilitation of Patellar Condromalacia

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Abstract

The present study aimed to determine the use of resistance exercises for rehabilitation of Chondromalacia Patella (CP). It is a pathology that affects many people in all age groups. For the development of this research we use as methodology the literature review. For the development of this study we use as methodology the literature review. The results found in the literature demonstrate that resisted exercises, especially those with closed kinetic chain are the most used and with better results in relation to the open kinetic chain, but they can be used if some procedures are respected, such as pain. The strengthening of the lower limb muscles is fundamental for the control and treatment of CP and it was evident that the most efficient and rapid way to achieve this goal is the use of resistance exercises. In this sense, it is concluded that the resistance exercise in the rehabilitation of the chondromalacia patellar demonstrates benefits in the treatment using physical exercises, because of the reduction in the contact between the patella and the femur and improvement of the functional capacity of the individual and the reduction of the pain felt by the patients carriers, thus progressively avoiding the progression of CP degrees.

Keywords: Knee; Chondromalacia; Exercise

Abbreviations: CP: Chondromalacia Patella.

Introduction

Patellar chondromalacia is known as the loss of patellar cartilage that may involve one or more portions thereof. Today we can say that it reaches a very high part of the population and is more frequent in the female gender [1]. The causes are diverse: instability, direct trauma, fracture, patellar subluxation, quadriceps angle increase, vastus medialis inefficient, posttraumatic misalignment, excessive lateral pressure syndrome and posterior

cruciate ligament injury [2]. When it occurs in young patients if it is not diagnosed and treated it can progress to premature osteoarthritis [3]. The evolution of the lesion can be defined in four (4) degrees:

- a. grade I - cartilage softening and edema;
- b. grade II - fragmentation and cracking over an area of 0.5 inch or less;
- c. grade III - fragmentation and cracking over an area of 0.5 inch or greater;
- d. grade IV - erosion of the cartilage to the bone.

One of the ways to treat this injury is to strengthen lower limb muscles, but quadriceps strengthening is essential for reducing symptoms of pain and discomfort in simple activities of daily living. One of the safest ways to accomplish this strengthening is using resistance exercises. In this sense, the present study aims to present, through bibliographical references, safe forms of muscle strengthening using resistance exercises.

Methodology

In this work we use the type of exploratory research, we want through our academic investigation to know if the resistance training helps in the rehabilitation of patellar chondromalacia; based on our theme and study, a survey was developed to collect and collect data on chondromalacia patella and everything that encompasses this disease, so the structure and causes that cause people to acquire this disease, knee anatomy (bones, muscles and articulations), the definition of patellar chondromalacia and how we can cope with CP and lessen its effect on people. We use as a source of research, on the instruction of our tutor, national academic articles, biological books, dissertations and theses online. Our study was based on a qualitative strategy, through a bibliographical research, our surveys seek to understand the causes, the evolution of the disease and how we present our result in the face of this problem.

Literature review

We can define patellar chondromalacia (Figure 1) as an injury to the articular cartilage caused by excessive friction between the patella and the femur [4]. This friction often generates a lot of pain which may be due to biomechanical changes. For a correct diagnosis it is necessary to resort to magnetic resonance imaging, which is now a more secure way of determining if there is an injury and the degree to which it is classified.

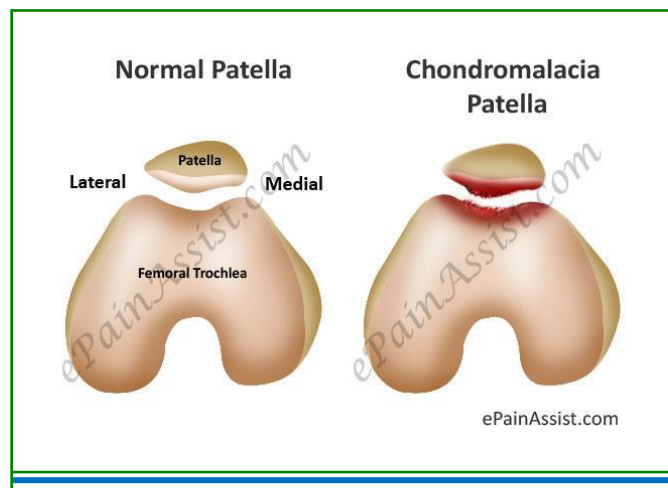


Figure 1: Patellochondromalacia.

It happens by an excess of pressure between two cartilages of the femoral trochlea and of the patella, eventually the cartilage of the patella has the function of cushioning the pressures of force and weight that are applied in the body, in turn the patella is the bone of the organism that suffers more compression pressure. We have as reference the argument of The patella is the bone of the organism that undergoes greater compression pressure, the compression force of the patellofemoral joint is approximately seven times the weight of the person depending on the activity developed. Imagine that a person of 70 kg, for example, can apply a pressure of approximately 500 kg on his patella, depending on the activity developed. Knowing this, it is easy to understand that minor changes in behavior can hurt the cartilage of the patella [5].

The compression pressure is exerted by a force on a body, tending to approximate the parts that compose it, therefore the pressure of the patella on the femur increases depending on the exercise or function effected in daily use, such as going up and down stairs, jumping, exercise practices such as leg-press, squats, or races, so they can cause the disease to evolve.

Causes of chondromalacia

There is no clear understanding of the causes of COP, Machado & Amorin [6] some authors attribute this pain to intrinsic and extrinsic risk factors, i.e., repetitive stress of the knee joints (running or jumping) and genetic (anatomical or structural) are slightly related to the appearance of this type of lesion. Other factors include lack of mobility, inadequate exercise, obesity, patellar hyperpigmentation, arthrosis, and steady use of high heels (sandals), or may be due to a genetic event with no apparent cause. Eventually, there was a higher incidence of CP in the female gender, due to a knee deviation called dynamic valgus. This is due to the genetically wider females' hip shape, exactly to facilitate normal delivery.

Studies indicate that some muscle groups (quadriceps and buttocks) of women, when compared to men, present some delay in their activation during some activities. This makes the impact of a woman's joints during a jump landing, for example, much greater. In addition, the fact that women's pelvis is wider than men's, causes their knees to be slightly more inwardly projected, which may alter the fit of the patellofemoral joint and consequently generate overload, especially in the lateral region of the patella [7]. The causes of chondromalacia are partially linked to loss of joint fluid and premature wear of the articular cartilage. It can also reach other more advanced

levels and thus worsen for arthrosis (a disease that attacks the joints promoting joint cartilage wear). By so we understand that the candidate does not feel pain due to the CP itself, but mainly due to the inflammations of the region.

Symptoms of chondromalacia

CP may present numerous symptoms, and in this chapter, we will cover some pre-indications that may help identify CP. We know that it is a pathology of chronic origin, as we saw in the previous chapter, that is, caused many times by repetitive stress or impact on the patellofemoral joint. According:

The main symptoms may be: pain in the anterior knee (behind the patella) when going up and down stairs or even slopes, to physical exercises, when getting up from a chair, when crouching and even keeping the knee flexed for periods prolonged; crackling and clicking behind the patella by flexing and extending the knee, sometimes audible; edema and joint effusion that are caused by the excessive accumulation of synovial fluid formed in the inflammatory process [8]. It is relevant to note that CP is not always symptomatic, at the time the patient manifests some symptom, are usually characterized with pain in the anterior part of the knee region, to be more specific in the posterior part of the patella chronic pain, without traumatic incidents. This pain usually appears and increases during daily activities (up and down stairs, as well as hooking up etc.); Another common symptom is the presence of cracks, which occur mainly when crouching and getting up, which comes accompanied or not by pain.

According to the research performed, it can be noticed that the symptom of Patellar Chondromalacia is perceived by continuous pains in the knee, people with CP can have acute crises of pain, linked to the beginning of activities that use the concentration of the lower limbs.

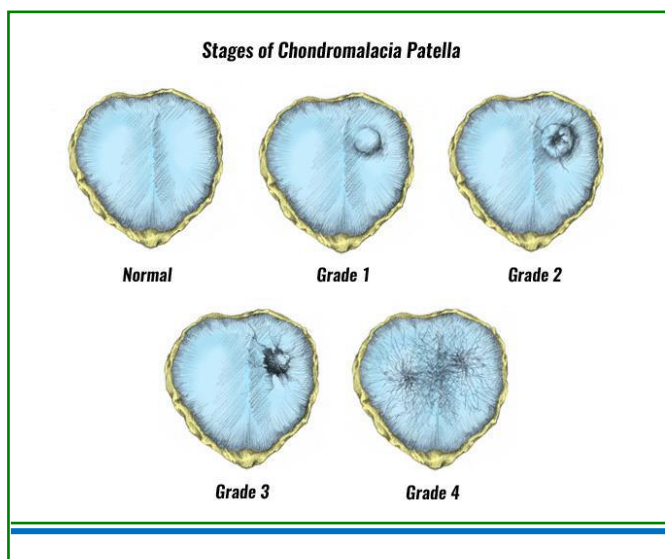


Figure 2: Chondromalacia and its classifications.

According to Monnerat et al. [9], the classification described by Outer bridge (1961), there are 4 levels of patellar chondromalacia, according to the stage of cartilage deterioration: I - cartilage softening and edemas - II - cartilage fragmentation or fissures with diameter - III - fragmentation or fissures with diameter > 1.3 cm - IV - erosion or complete loss of articular cartilage, with subchondral bone exposure (Figure 2) [10].

Articular rehabilitation

The most indicated exercises for rehabilitation are those with a closed kinetic chain, because they are movements that reproduce functional movements similar to those performed in the activities of daily living. They are also indicated to bring greater joint stability, because they produce the co-contraction of the agonist and antagonist muscles [11].

Therefore, we can affirm that multi-articular exercises are more pertinent, since they do not overload a specific muscle, but rather strengthen the muscular complex responsible for that region, besides being more functional, since they resemble daily activities. In addition to work on strength resistance, we may also be using isometric exercises and exercises that provoke instability, since one of the reasons for acquiring this pathology would be the lack of muscular stability.

Weathered exercises

When we begin a rehabilitation program advised by a physical or clinical specialist, the primary instruction to follow is to seek an orthopedist with a knee specialization, for a better evaluation of the clinical picture, as mentioned in the previous chapter (chondromalacia and its classifications), we have four CP levels and for a better prescription of professionals in this area it is important to know what we are dealing with. The CP treatment is based on clinical and physical analysis, aiming to locate the stage and severity of the lesion. Depending on the degree of the injury, the physician will refer the patient to physical therapy or to a physical education professional. For muscle strengthening (strength, resistance, isometry, proprioception etc.) with pre-established and individualized diagnosis [12].

The physical education professional plays a fundamental role in the use of exercise to delay the advance of CP, since it is the agent that can request through medical examinations and through a physical evaluation of the student in conjunction with the physical therapist. Such observation according to Pinto et al. [11]. We can adjust in the exercises in relation to the joint amplitude, one of the

strategies would be in the squat, adjusting the angle of movement according to the pain, starting with loads and progressively increasing the angle and then the load.

Results

We observed with this study that resistance training is fundamental for the treatment of this pathology. Because it is a safe and non-impact training method, it is well received by most people as well as being the fastest way to achieve muscle strengthening, especially the lower limb muscles that are critical to reducing pain. For the treatment of the CP we only analyzed the resisted exercises, thus saying the bodybuilding itself, according to the elements analyzed the main benefit is gradually the absence of pain. Consequently, after the decrease of pain, we can see a significant improvement in functional quality, thus improving their daily activities. We observed that exercises in closed kinetic chain are the most indicated, an exercise alternative to be prescribed in the rehabilitation of CP, with exceptions associated with the degree of the injury, because they are multi-articular exercises, producers of co-contraction of anterior muscles, posterior muscles, muscles adductors, abductor muscles, internal and external rotator muscles of the hip, and so on. Thus, generating greater torque, improving the motor functional quality of the affected.

However, studies show that open kinetic chain exercises can be used provided that some principles such as latent pain and angle of execution are respected. According to Dantas et al. [13] physical exercise will not provide regenerative effects on the articular cartilage and the greater the degree of cartilage softening the more complicated the treatment and the greater the pain experienced by the individual. Resistance exercise will not promote regenerative improvements to the patient, but rather, joint improvements, since the resisted work will promote hypertrophy of the thigh muscles (rectus femoris, medial, lateral and intermediate), thus improving muscle tone, promoting a greater torque in the knee flexion and extension movements. We can adjust in the exercises in relation to the joint amplitude, one of the strategies would be in the squat, adjusting the angle of movement according to the pain, starting with loads and progressively increasing the angle and then the load.

Conclusion

Therefore, the treatment based on resistive exercise promoted improvements in CP symptoms and improvements in joint mobility of the knee, but no regenerative improvements in the articular cartilage of the knee. It is an area that needs more studies on the use

of resistance exercise in PC rehabilitation and that many discussions of this kind can help to create new, more efficient and less painful forms of treatment.

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