CURRENT CONCEPT REVIEW

Evidence Based Conservative Management of Patello-femoral Syndrome

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Abstract

Patellofemoral pain syndrome (PFPS) is defined as pain surrounding the patella when sitting with bent knees for prolonged periods of time or when performing activities like ascending or descending stairs, squatting or athletic activities. Patella dislocation is not included in PFPS.

This review analyzes the evidence based conservative management of PFPS. A Cochrane Library search related to PFPS was performed until 18 January 2014. The key words were: patellofemoral pain syndrome. Eight papers were found, of which three were reviewed because they were focused on the topic of the article. We also searched the PubMed using the following keywords: evidence based conservative management of patellofemoral pain syndrome. Twelve articles were found, of which seven were reviewed because they were focused on the topic of the article. Overall ten articles were analyzed.

Different treatments can be tried for PFPS, including pharmacotherapy, therapeutic ultrasound, exercise therapy, and taping and braces. Non-steroidal anti-inflammatory drugs (NSAIDs) may reduce pain in the short term, but pain does not improve after three months. Therapeutic ultrasound appears not to have a clinically important effect on pain relief for patients with PFPS. The evidence that exercise therapy is more effective in treating PFPS than no exercise is limited with respect to pain reduction, and conflicting with respect to functional improvement. No significant difference has been found between taping and non-taping. The role of knee braces is still controversial. More well-designed studies are needed.

Key words: Conservative management, Knee, Patellofemoral pain syndrome

Introduction

Patellofemoral pain syndrome (PFPS) characteristically causes vague discomfort of the inner knee area, aggravated by activity (running, jumping or descending stairs) or by prolonged sitting with knees in a moderately bent position (1). PFPS is caused by an abnormality in how the patella slides over the lower end of the femur. Knock-kneed and flat-footed runners and persons with an unusually shaped patella are predisposed to PFPS. PFPS has also been called "housemaid's knee", "secretary's knee" and chondromalacia patella. Patellar dislocation never must be included into the diagnosis of PFPS.

Conservative management of PFPS is all debated in literature, but consensus has not been reached so far. The purpose of this review is to analyze the existing strategies for the evidence based conservative treatment of PFPS.

Materials and Methods

Cochrane Library systematic reviews related to the conservative treatment of PFPS were searched until 18 January 2014. The key words were: patellofemoral pain syndrome. Eight papers were found, of which three were reviewed because they were focused on the topic of the article. We also searched the PubMed until 18 January 2014 using the following keywords: evidence based conservative management of patellofemoral pain syndrome. Twelve articles were found, of which seven were reviewed because they were focused on the topic of the article. Overall ten articles were analyzed.

Results

Taping and Braces

Callaghan *et al* (2) reported a meta-analysis from four trials focused on patellar taping for PFPS. They found no statistically or clinically significant difference between

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taping and non-taping in pain. Patellar taping involved the application of adhesive sports medical tape applied directly to the skin over the patella on the front of the knee.

In another systematic review of interventions for preventing lower limb soft-tissue running injuries, Yeung *et al* found that patellofemoral braces appear to be effective for preventing anterior knee pain (3). However, in a critical review of the clinical trials on nonoperative therapy of PFPS knee braces were not effective in treating the condition (4).

Pharmacotherapy

Pharmacological treatments of PFPS focus on reducing pain symptoms (non-steroidal anti-inflammatory drugs (NSAIDs), glucocorticosteroids), or restoring the assumed underlying pathology (compounds containing glucosamine to stimulate cartilage metabolism, anabolic steroids to increase bone density of the patella and build up supporting muscles).

Heintjes *et al* summarized the evidence of effectiveness of pharmacotherapy in reducing anterior knee pain and improving knee function in people with PFPS (5). Heintjes *et al* performed a systematic review aiming to summarize the evidence of effectiveness of pharmacotherapy in reducing anterior knee pain and improving knee function in people with PFPS. Aspirin compared to placebo in a high quality trial produced no significant differences in clinical symptoms and signs. Naproxen produced significant short term pain reduction when compared to placebo, but not when compared to diflunisal. Laser therapy to stimulate blood flow in tender areas led to more satisfied participants than tenoxicam, though not significantly. Twelve intramuscular injections of glycosaminoglycan polysulphate (GAGPS) in six weeks led to significantly more participants with a good overall therapeutic effect after one year, and to significantly better pain reduction during one of two activities. Five weekly intra-articular injections of GAGPS and lidocaine were compared with intra-articular injections of saline and lidocaine or no injections, all with concurrent quadriceps training. Injected participants showed better function after six weeks, though only the difference between GAGPS injected participants and non-injected participants was significant. The differences had disappeared after one year. One trial found that intramuscular injections of the anabolic steroid nandrolone phenylpropionate significantly improved both pain and function compared to placebo injections. The conclusion was that there is only limited evidence for the effectiveness of NSAIDs for short term pain reduction in PFPS. The evidence for the effect of glycosaminoglycan polysulphate is conflicting and merits further investigation. The anabolic steroid nandrolone may be effective, but is too controversial for treatment of PFPS.

Therapeutic ultrasound

Therapeutic ultrasound is one of several rehabilitation interventions suggested for the management of pain due to PFPS. Brosseau *et al* assessed the effectiveness and side effects of ultrasound therapy for treating PFPS (6). Ultrasound therapy was not shown to have a clinically important effect on pain relief for patients with PFPS. These conclusions were limited by the poor reporting of the therapeutic application of the ultrasound and low methodological quality of the trial included. No conclusions could be drawn concerning the use or non use of ultrasound for treating PFPS.

Exercise therapy

Exercise therapy to strengthen the quadriceps is often prescribed in PFPS, though its efficacy is still debated. Heintjes *et al* summarized the evidence of effectiveness of exercise therapy in reducing anterior knee pain and improving knee function in patients with PFPS (5). The evidence that exercise therapy is more effective in treating PFPS than no exercise was limited with respect to pain reduction, and conflicting with respect to functional improvement. There is strong evidence that open and closed kinetic chain exercises are equally effective. Further research to substantiate the efficacy of exercise treatment compared to a non-exercising control group is needed, and thorough consideration should be given to methodological aspects of study design and reporting.

In the critical review of the clinical trials on nonoperative therapy of PFPS reported by Arroll *et al* guadriceps muscle exercises were effective in treating this condition (4). In another systematic review of physical interventions for PFPS Crossley *et al* reported a consistent improvement in short-term pain and function due to physiotherapy treatment (7).

Discussion

Delayed onset of electromyographic activity of the vastus medialis obliquus-vastus lateralis is one of the contributing risk factors to the development of PFPS (8). The currently most plausible pathophysiologic theory for the etiology of pain in patients with PFPS involves abnormal mechanical stress to the patellofemoral joint. At this time, there is no consensus nor is there a sufficient body of research evidence to guide management of patients with PFPS. This means that clinicians have to rely to some extent on a mechanism-based approach. Decreased quadriceps flexibility and muscular endurance have been identified as possibly relevant impairments in patients with PFPS (9).

According to Bolgla *et al* general quadriceps strengthening continues to reduce pain in patients with PFPS (10). Data were inconclusive regarding the use of patellar taping, patellar bracing, knee bracing, and foot orthosis. Although emerging data suggested the importance of hip strengthening exercise, ongoing investigations are needed to better understand its effect on PFPS.

In conclusion, PFPS is common among adolescents and young adults. The most common symptom is pain surrounding the patella when sitting with bent knees for prolonged periods of time or when performing activities like ascending or descending stairs, squatting or athletic activities. Different treatments can be tried to reduce the

pain and difficulties experienced during daily activities, including pharmacotherapy, taping and braces, ultrasound therapy and exercise therapy. A review of pharmacological interventions showed that non-steroidal anti-inflammatory drugs (NSAIDs) may reduce pain in the short term, but overall pain did not improve after three months. There is conflicting evidence on the effect of glycosaminoglycan polysulphate. The anabolic steroid nandrolone may be effective, but associated risks demand extreme caution if used for PFPS, particularly in athletes. Ultrasound therapy was not shown to have a clinically important effect on pain relief for patients with PFPS. The review of exercise therapy found some evidence that exercise therapy might help to reduce the pain of PFPS.

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