

Clinical Approach for the Selection of Taping Techniques for Knee Pain

Arie Michaeli (M.Sc Physio (Wits) Certified McConnell Instructor South Africa), gives his clinical tips for the selection of taping techniques for knee pain based on his clinical experience.

Patellofemoral pain syndrome (PFPS) is a common condition presenting to physiotherapists and orthopaedic surgeons (Fulkerson & Hungerford 1990). Despite its prevalence, the aetiology, pathogenesis, and recommended treatment remain unclear (Insall et al 1976). The success rate of treatment regimens for this condition has been very poor and in the long-term, the condition frequently recurs (McConnell 1996). In the past the only available options were surgery or curtailing physical activity.

ALTERNATIVE

Jenny McConnell, an internationally renowned physiotherapist, has developed an easy, painless, safe and inexpensive alternative (McConnell 1986). The treatment involves a unique method of taping the painful knee to realign the patella within the femoral trochlea. Once the patient is pain-free, specific quadriceps and pelvic motor control training is undertaken. This is accompanied by stretching of tight muscles and correction of the lower limb and foot position.

EFFECTS OF TAPING

One component of treatment for PFPS that has been subjected to scrutiny is patellar taping. Clinical and research findings confirm that the pain associated with PFPS is significantly reduced with patellar taping [Handfield & Kramer 2000].

There is evidence to suggest that patellar tape improves:

- 1) patella alignment measured radiographically (Somes et al 1997) and
- 2) quadriceps function (torque production and extensor moments) (Ernst et al 1999).

Evidence that patellar tape enhances the activation of individual vastii (magnitude or timing) is limited in quality and quantity [Cerny K 1995].

There is preliminary evidence for improved knee control during gait in association with patellar tape [Powers et al 1997].

However, a clinically significant weakness of using assessment of patellar position to determine taping method, as advocated by McConnell (McConnell 1986), is that the accuracy of the measurements relies heavily on the palpation skills of the therapist. As palpation for patellar position has been shown to lack reliability and validity as an evaluation tool its value in guiding the choice of taping method is questionable (Powers et al 1999; Watson et al 1999).

CLINICAL APPROACH TO TAPING

The purpose of this article is to describe an alternative set of criteria for selecting patellar taping method.

There are two types of taping methods which are described in this article:

- direct techniques which are applied over the patella and
- unloading techniques which have no direct contact with the patella. Muscles, tendons, ligaments, the fat pad as well as the patellofemoral joint can be unloaded using tapes.

The following criteria need to be taken into consideration when using a taping technique:

- A. Severity of knee pain
- B. Area of knee pain
- C. Pathology
- D. Sporting vs non-sporting knee
- E. Patient response to taping

A. SEVERITY OF PAIN IN THE KNEE:

Patients can be categorised into two main groups according to the intensity of their pain:

1. Severe pain: intermittent or constant. (8/10 - 10/10 using the Visual Analogue Scale)
2. Mild to moderate pain (less than 8/10, using the Visual Analogue Scale).

When the patient presents with severe pain, the diamond unloading technique (Figure 1) should be the taping technique of first choice.

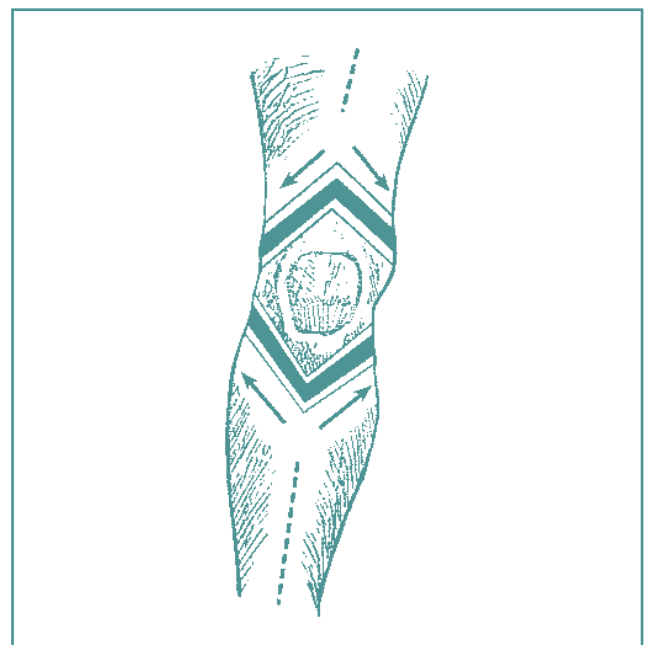


Figure 1: Diamond unloading technique

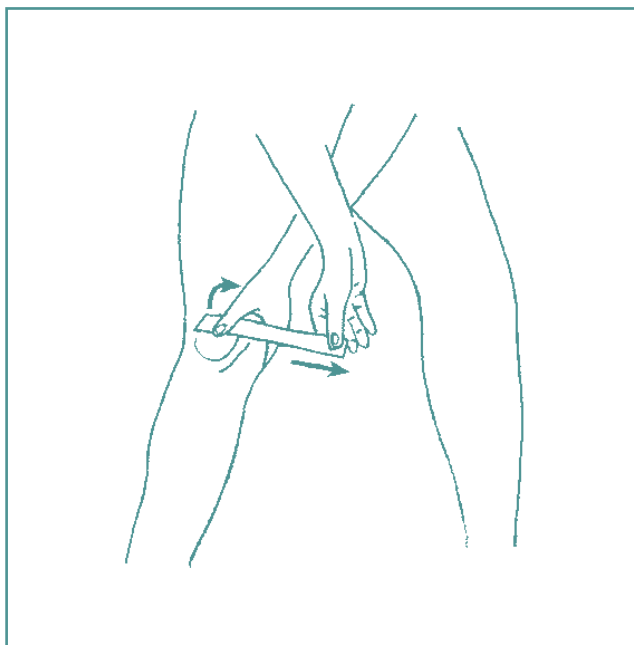


Figure 2: Taping the patella medially - elevation of inferior pole

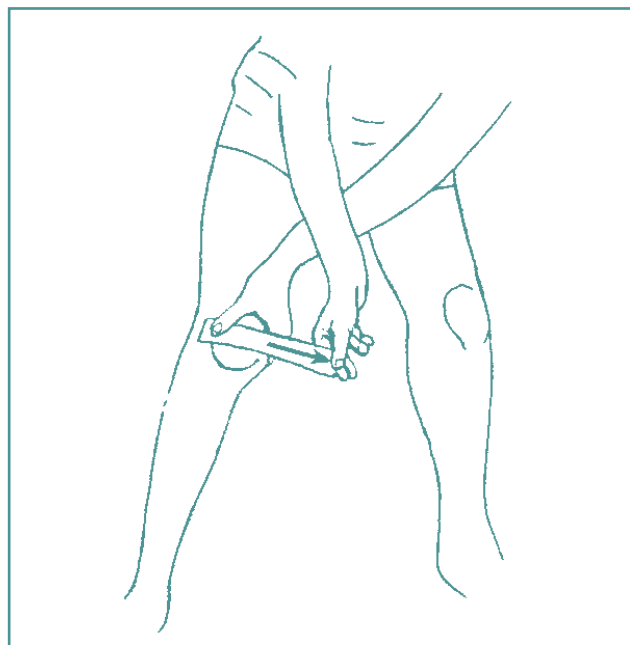


Figure 3: Taping the patella medially

The intensity of pain is reported by the patient during the subjective assessment and is produced during a single leg squat test or Extension Weight Bearing (EWB) test. With the EWB test, the patient is requested to fully extend his/her knee while bearing weight.

The diamond unloading technique appears to reduce the patellofemoral reaction force and unload the inflamed retinaculum and irritable articular cartilage.

When the patient complains of intermittent, mild to moderate pain, try using direct taping techniques which have direct contact with the patella. All techniques which 'shift' the patella medially can be selected: (Examples can be seen in Figures 2,3 & 5).

B. AREA OF KNEE SYMPTOMS:

Inferior Knee Pain (IKP)

The following conditions can produce IKP: patellar ten-

donopathies, fat pad impingement, chondromalacia (CMP) of the inferior pole, Osgood-Schlatter and Sinding-Larsen-Johansson Syndrome.

Start with elevating the inferior pole (Figure 2) performed in knee extension and then add a second layer of tape with the knee in 20° flexion.

Assessment of movement tests will guide you as to whether you should add the V shape unloading technique for achieving better pain relief (Figure 4).

This sequence of techniques will be suitable for any pathology which can cause inferior knee pain. Pure patellar tendonopathy WITHOUT patellofemoral maltracking is unlikely to respond to patellar taping. However, taping directly over the patellar tendon is a possible option. This technique is not illustrated.



Figure 4: V shape unloading technique

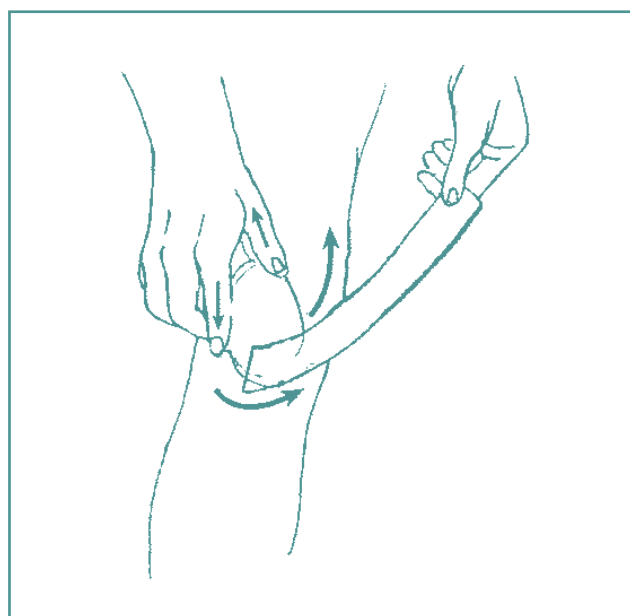


Figure 5: The second component of the sporting tape: rotating the inferior pole medially.

Medial Knee Pain (MKP)

Patellofemoral dysfunction, tear of the medial meniscus and medial collateral ligament sprain can contribute to MKP. These 'diagnoses' can respond successfully to taping the patella medially. The tape should cover the painful area. Suitable techniques are shown in Figures 2,3 & 5, with figure 3 being your first choice for the non-sporting knee.

Posterior Knee Pain (PKP)

PKP can sometimes be referred from the anterior compartment of the knee. This could be alleviated by effective taping of the Patellofemoral joint. If the origin of the pain is Baker's cyst, the tape should be long enough to contain the area of the symptoms. In addition to proprioceptive effect the tape creates mechanical pressure on the lesion.

Lateral Knee Pain

When pain originates from Iliotibial band syndrome, it will respond well to unloading taping of the tight ITB plus unloading of the painful area (taping technique not illustrated).

C. PATHOLOGY:

Patellofemoral effusion will require the diamond shape unloading method (Figure 1). The effusion will dramatically subside within a week of using a combination of diamond shape taping, non-steroidal anti-inflammatory drugs and anti-inflammatory electrotherapy modalities.

Post-arthroscopy - the best taping method for the first two weeks after surgery if the knee is painful and swollen is the diamond shape. The length of use of the diamond shape depends on the amount of swelling and severity of pain. The skin requires special care, as does the incision area.

Osteo-arthritis of the patellofemoral joint - when associated with severe crepitus, mild effusion and pain even less than 7/10 (VAS), use the diamond unloading first. In less severe cases, try direct taping techniques. Sometimes taping the patella laterally should be tried. (Diagram is not provided)

Post-retinacular release - if still symptomatic in some cases, try taping the patella laterally.

Dynamic Maltracking (DM) of the patella known also as Quadriceps imbalance, is determined by an over active Vastus Lateralis muscle associated with decreased intensity and delayed activation of contraction of the Vastus Medialis Muscle (VMO).

DM of the patella can be established by using Surface Electro-myography. DM is commonly found in the active sport person. The area of pain reported by the patient could be medial, lateral and or retro patellar.

DM of the patella will respond dramatically to the 'sporting taping technique' which is a combination of elevating the inferior pole (see Figure 2) and rotating it medially (see Figure 5) executed in slight flexion.

D. THE SPORTING VS NON-SPORTING KNEE:

The sporting patellofemoral joint will require firmer taping techniques. Two or three layers of tapes can be used, with the sporting technique being the most frequently applied. Combination of Figure 2 and Figure 5.

E. PATIENT RESPONSE:

This is a very important concept when using tapes for pain relief. Any taping technique described in this article or which you develop and which alleviates the patient's symptoms, should be pursued. In other words, if it works for your patient, use it.

Additional Tips for Taping Selection and Successful Results:

1. Always re-assess before and after taping using "provocative", comparable movement/s.
2. You should, in most cases, be able to relieve patient's symptoms by 50-75% on the results of provocative movements tests at the initial consultation.
3. Patient compliance is critical. He/she must be:
 - a. proficient in the application of the taping techniques
 - b. familiar with the prevention of skin problems
 - c. able to ensure tapes remain tight during sporting activities

TABLE 1: SUMMARY OF CLINICAL PRESENTATION OF PFPS AND SUGGESTED TAPING METHOD

Clinical Presentation & Pathology	Taping Method
<ul style="list-style-type: none"> • Severe retro & peri patellar pain (8/10 or more). • Effusion, post-arthroscopic surgery, severe crepitus 	Diamond unloading (figure 1)
<ul style="list-style-type: none"> • Mild to moderate, inferior knee pain of any origin. 	Elevating the inferior pole Tape in extension & in slight flexion (figure 2)
<ul style="list-style-type: none"> • Severe inferior knee pain or inferior knee pain which doesn't respond to figure 2 	Elevating and unloading the inferior pole: V shape (figures 2 & 4)
<ul style="list-style-type: none"> • Different areas of pain - mild to moderate pain 	Taping the patella medially (figure 3)
<ul style="list-style-type: none"> • Mild to moderate pain in the sporting person, quadriceps imbalance 	The sporting technique: elevating the inferior pole and rotating it medially, tape in slight flexion. Combination of figure 2 and figure 5.
<ul style="list-style-type: none"> • Very tight VL or ITB associated with quadriceps imbalance 	Tape the patella medially first (sporting tape). Unload the VL or ITB (not illustrated).

What If Taping Doesn't Improve Symptoms by at least 50%?

McConnell summarised possible causes for not achieving successful results (McConnell 1996):

1. Patient requires unloading tape, as well as the patellar tape;
2. Tape was poorly applied by the physiotherapist and/or patient;
3. Incorrect selection of taping techniques;
4. Patient has an intra-articular primary pathology which is inappropriate for taping.

It is a common misconception that patella taping - and taping alone - is sufficient for the management of PSPS.

An integrated approach including quadriceps training, stretches of tight lower limb muscles as well as correction of the lower limb and foot alignment is essential.

And, if this integrated approach fails, it could be as a result of:

1. Still too much emphasis on the taping, and neglect of total management.
2. Poor compliance with exercises.
3. Patient is too ambitious and not prepared to temporarily curtail physical activities.
4. Physiotherapist inexperienced in patellofemoral rehabilitation.
5. Complex regional pain syndrome and psychological problems might create resistance to taping and subsequently slow down the rate of progression.

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We would welcome any feedback on this article as well as your experience with taping as a treatment modality. E-mail Arie at clinisol@mweb.co.za or **PhysioForum at mandiwrite@icon.co.za.**



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