Topical Combination Treatment for Medial Knee Pain Using Magnesium, Ketoprofen, Lidocaine and Menthol

Knee complications are on the rise in Canada. This case reports a woman with medial knee pain successfully treated with a personalized topical combination of magnesium, ketoprofen, lidocaine and menthol in PCCA Lipoderm. After two weeks, the patient reported reduced pain across all descriptors and significant improvement in her quality of life.

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Introduction:

Canadians are experiencing more knee pain and getting more knee-based surgeries than ever before. Dr. Najam Mian, a physical medicine and rehabilitation specialist in Vancouver, told Global News that "along with back pain, knee pain is one of the most common presenting symptoms in musculoskeletal, sports medicine and chronic pain clinics across the country." Dr. Paul Wong, chief of orthopedics at Michael Garron Hospital in Toronto, added that knee complications in Canada are becoming a "quiet epidemic" [1]. This case study aims to present the pharmacological management of knee pain using topical combination treatment.

Figure 1. *Health care concept: woman suffering from pain in knee, closeup. Adapted from Shutterstock.com (stock vector ID 652751140).*

Case Report:

A 63-year-old woman experienced a tripping accident and subsequently developed medial knee pain, which refers to pain located on the inner side of the knee. The term "medial" is an anatomical direction meaning "toward the midline of the body." A surgical intervention was not indicated but the patient suffered from acute pain, which was managed initially with the commercial medication Tylenol® Extra Strength (acetaminophen 500 mg). However, the patient was still unable to bear weight or toe touch. This impairment had a profound impact on the patient's quality of life and her local compounded pharmacist recommended a personalized, topical combination treatment (Table 1).

Rx	*100 g*
Magnesium Chloride USP Hexahydrate	20 g
Ketoprofen USP, PCCA Special Micronized	10 g
Lidocaine Hydrochloride USP	5.335 g
Menthol USP (L) Natural Crystals	1 g
Dimethyl Sulfoxide USP (DMSO)	3 g
Alcohol USP (Ethanol 190 Proof)	1 g
PCCA Lipoderm®	59.665 g

Table 1. *Magnesium Chloride Hexahydrate 20%, Ketoprofen 10%, Lidocaine HCl 5%, Menthol, Topical Lipoderm: PCCA Formula 15363.*

The active pharmaceutical ingredients (APIs) of the topical combination treatment were carefully selected for their mechanisms of action, aiming to achieve a synergistic effect in multimodal pain management. Magnesium's analgesic effect is related to the prevention of central sensitization caused by peripheral tissue injury. [2]. Ketoprofen is a nonsteroidal anti-inflammatory drug (NSAID) that inhibits the production of cyclooxygenase, an enzyme responsible for the production of inflammatory mediators such as prostaglandins and leukotrienes, thereby reducing inflammation and pain [3,4]. Lidocaine is a local anesthetic that blocks sodium channels, preventing the initiation and conduction of nerve impulses [5]. Menthol provides a cooling sensation by activating transient receptor potential melastatin 8 (TRPM8) channels, which can distract from pain sensations [6].

PCCA Lipoderm is a proprietary permeation-enhancing vehicle, scientifically proven to deliver APIs through the skin, even up to four at one time. It has been extensively used in clinical practice in the field of topical pain management [7-9].

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Results and Discussion:

The patient was asked to complete the short form of the McGill Pain Questionnaire (SF-MPQ) retrospectively, with reference to before and after topical combination treatment. This validated pain assessment tool evaluates both the sensory and affective dimensions of pain (15 descriptors); it includes a Visual Analog Scale (VAS) and a Present Pain Intensity (PPI) index [10].

The topical treatment was applied three times a day for two weeks, and afterwards only as needed. Before treatment, the patient classified 5 descriptors as severe (throbbing, stabbing, sharp, hot-burning and aching), and 1 descriptor (tender) as moderate (Table 2). All other 9 descriptors were deemed not applicable. The intensity of the physical pain was rated as 10 (worst pain), and the overall pain was classified as "excruciating."

After two weeks of topical combination therapy, the patient reported a reduction in all previously classified severe pain descriptors to either moderate or not applicable. Local tenderness decreased from moderate to mild, as shown in Table 2. Regarding the VAS and PPI, the intensity of physical pain decreased to a score of 6, while overall pain was described as merely "discomforting."

Pain Descriptor	Before Treatment	After Treatment
Throbbing	Severe	Moderate
Stabbing	Severe	*na*
Sharp	Severe	Moderate
Hot-burning	Severe	Moderate
Aching	Severe	Moderate
Tender	Moderate	Mild

Table 2. *Patient's classification of 6 pain descriptors (mild, moderate or severe) retrospectively, with reference to before and after topical combination therapy.*

Testimonials:

The patient is an avid runner and is now back running regularly. If knee pain flares up from time to time, she uses the cream and finds it very beneficial.

Prior to using the cream, I could not toe touch. However, after using the cream for 4 days, I was able to toe touch when walking and weight bear with minimal pain.

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