**PHONOPHORETIC DELIVERY OF KETOPROFEN (FASTUM GEL) : COMPARISON BETWEEN LOCAL AND SYSTEMIC EFFECTS.** **Cagnie B, Vinck E, Rimbaut S, Vanderstraeten G, Department of Rehabilitation Sciences and Physical Therapy. University of Ghent. Ghent. Belgium.**

**PURPOSE**: The purpose of this study is to examine the efficacy of utilizing ultrasound (US) to deliver ketoprofen transdermally in humans while using clinically relevant parameters and media. The secondary objective is to compare the concentrations found after a continuous and pulsed application.

**RELEVANCE**: The possibility of delivering nonsteroidal anti-inflammatory drugs (NSAIDs) through the skin for either local or systemic effects is being investigated increasingly, but there are conflicting reports in the literature concerning these effects.
SUBJECTS: 26 patients who suffered from knee disorders requiring arthroscopy.

**METHODS AND MATERIALS**: Patients were randomly assigned to either group A, B or C. Patients in group A and B received phonophoresis with ketoprofen of 1 MHz with an intensity of 1,5 W/cm² during 5 minutes. Group A was given continuous US, whereas group B obtained pulsed US (100 Hz, 20% DC). The third group (C) received sham phonophoresis with ketoprofen (topical application of ketoprofen with no US). To evaluate the local penetration of ketoprofen, adipose tissue and synovia were taken during the knee-arthroscopy. To determine the systemic effect of phonophoresis, blood samples were collected 120 minutes after topical application of fastum gel.

**ANALYSES**: Statistical differences ($p<0.05$) between groups were determined by the nonparametric Mann Whitney U test (2 groups) and kruskal-Wallis ANOVA (3 groups). Two-related sample analysis examined the difference in concentration ketoprofen between plasma, fat and synovia.

**RESULTS**: The concentration ketoprofen in plasma is negligible. The concentration ketoprofen found in synovial tissue is significantly higher than the concentration found in fat tissue. Only a significant difference concerning synovial tissue is found between the control group (1.67 ng/mg) on the one hand and the pulsed (41.60 ng/mg) and continuous group (32.55ng/mg) on the other hand. The concentration ketoprofen in fat and synovial tissue is consistently higher in the pulsed group than in the continuous group.

**CONCLUSIONS**: this study confirms that topical applications of ketoprofen allow the attainment of high local concentrations, whereas systemic exposure is low. The results indicate that US is efficacious in delivering ketoprofen transdermally in contrast with the control group. This study also suggests that the use of pulsed US seems to be more efficacious than the use of continuous US, although there was no statistical difference.