

## **Effect Of Transdermal Microneedle Patch With NSAID In Osteoarthritic Knee**

Orthopaedics / Knee & Lower Leg / Miscellaneous

Saradej Khuangsirikul, Mongkon Pisuttananwat, Danai Heebthamai, **Thanainit Chotanaphuti**

Department of Orthopaedics, Phramongkutklaol College of medicine, Bangkok, Thailand

Keywords: Transdermal Microneedle, Osteoarthritic Knee, NSAID

### **Background**

In early osteoarthritis (OA) knee without structural damage, synovial hypertrophy is a good biomarker to monitor disease progression and response to any treatments. NSAID has been proved to reduce inflammation or synovitis effectively. Transdermal microneedle is a non-invasive device to deliver medication by transdermal route. However, no recent study shows the effectiveness of transdermal NSAID via microneedle.

### **Objectives**

To determine the effect of transdermal microneedle patch (TDM) with NSAID in synovial hypertrophy, knee pain and WOMAC score of osteoarthritic knee.

### **Study Design & Methods**

Two-group, randomized, double-blinded, controlled trial was done. 100 participants, age 40-70 years, with painful knee OA and non-structural change on radiography will be randomly allocated to underwent either TDM (placebo) or TDM with NSAID (ketorolac 30 mg) at medial joint line of the knee once weekly for 2 times. Synovial thickness was measured by ultrasonography at pre-treatment, 1, 2, and 4 weeks. Pain score (VAS), WOMAC score and adverse events (AEs) were also recorded.

### **Results**

One hundred patients were enrolled into 2 groups. Comparing to TDM with NSAID and Placebo group demonstrated significant reduction of synovial thickness and VAS at 2, 4 weeks ( $P < 0.05$ ). Mean synovial thickness reduction were 1.12 and 0.27 mm. at 4 weeks And mean VAS reduction were 3.22 and 1.7 at 4 weeks (TDM with NSAID and placebo, respectively), but mean WOMAC score reduction statistically significant difference between groups at 4<sup>th</sup> weeks. Mean WOMAC score reductions were 5.71 and 0.96 at 4 weeks (TDM with NSAID and placebo, respectively). Treatment related adverse events in total 4 weeks, i.e. skin irritation, injection site pain, superficial skin infection were similar in all groups and no report of any complication

### **Conclusions**

Transdermal microneedle patch with NSAID significantly decreased synovitis and improved pain score in OA knee after 2 weeks and improve WOMAC score over 4<sup>th</sup> week without any adverse events.