

**PHYSIOTHERAPY MANAGEMENT IN A CASE OF BILATERAL KNEE
OSTEOARTHRITIS USING TRANSCUTANEOUS ELECTRICAL NERVE
STIMULATION (TENS) AND STRENGTHENING EXERCISES AT HERMINA
HOSPITAL DEPOK**

I Made krisna^{1*}, Andrew Wijaya Saputra²

^{1,2}Institut Kesehatan Hermina

Article Info	ABSTRACT
Article History: Received 06/05/2026. Revised - Accepted 14/07/2026 Keywords: Knee Osteoarthritis, Transcutaneous Electrical Nerve Stimulation, Strengthening	Background: Bilateral knee osteoarthritis (OA) is a degenerative joint disorder frequently affecting older adults, characterized by persistent pain, joint stiffness, quadriceps weakness, and reduced functional capacity. These impairments significantly limit daily activities and overall quality of life. Physiotherapy interventions, particularly Transcutaneous Electrical Nerve Stimulation (TENS) and targeted quadriceps strengthening exercises (quad sets), are commonly utilized to address pain and functional deficits in knee OA. Objective: To evaluate the effectiveness of combining TENS and quadriceps strengthening exercises (quad sets) in reducing pain and improving functional outcomes in patients with bilateral knee OA. Methods: This study employed a case study design conducted over five treatment sessions. Outcome measures included pain intensity assessed using the Numeric Rating Scale (NRS), muscle strength evaluated through Manual Muscle Testing (MMT), range of motion measured with a goniometer, and functional status assessed using the WOMAC index. Results: The intervention resulted in a marked reduction in movement-related pain (NRS decreased from 7 to 2) and an improvement in knee extensor muscle strength (MMT increased from grade 4 to grade 5). No changes were observed in knee flexion and extension range of motion. Functional ability showed substantial improvement, as indicated by a decrease in the WOMAC score from 38 to 8. Conclusion: The combined application of TENS and quadriceps strengthening exercises is effective in alleviating pain, enhancing muscle strength, and improving functional performance in patients with bilateral knee osteoarthritis, although it does not appear to influence joint range of motion within the observed treatment period. <i>Keywords: Knee Osteoarthritis; Transcutaneous Electrical; Nerve Stimulation; Strengthening.</i>
<i>*Corresponding Author: imadekrisnaputra@gmail.com</i>	