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Molecular changes after shockwave therapy in osteoarthritic knee in rats

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This study investigated the molecular changes of DKK-1, MMP13, Wnt-5a and β-catenin after extracorporeal shockwave therapy (ESWT) in anterior cruciate ligament transected (ACLT) osteoarthritic knees in rats.

Methods: Twenty-seven Spraque-Dawley rats were divided into 3 groups. Group I was the control. Group II underwent ACLT but received no ESWT. Group III underwent ACLT and received ESWT. Radiographs of the knee were obtained at 0 and 12 weeks. The animals were sacrificed at 12 weeks, and the articular cartilage and subchondral bone of the knee were subjected to histopathological examination and immunohistochemical analysis.

Results: Radiographs of the knee showed no discernable difference among 3 groups at 0 week. At 12 weeks, Group II showed more prounced arthritic changes with formation of osteochondral fragments, whereas very subtle arthritis was noted in Groups I and III. In histopathological examination, group II showed significant increases of Mankin score and decreases of subchondral trabecular bone as compared to groups I and III. Group III showed significant decreases of Mankin score and increases of subchondral trabecular bone as compared to group I. In immunohistochemical analysis, group II showed significant increases of DKK-1 and MMP13 and decreases of Wnt-5a and β-catenin in articular cartilage and subchondral bone as compared to groups I and III. Group III showed significant decreases of DKK-1 and MMP13 and increases of Wnt-5a and β-catenin as compared to group I.

Conclusion: ESWT produces molecular changes associated with the improvements in subchondral bone remodeling and chondroprotective effect in ACLT OA knees in rats.

Biography

Ching-Jen Wang, M.D. graduated from National Taiwan University, College of Medicine. He is a board certified orthopedic surgeon and currently holds a clinical faculty at Chang Gung University College of Medicine and serves as a consultant orthopedic surgeon of Kaohsiung Chang Gung Memorial hospital, Taiwan. He has published more than 185 papers in reputed journals and has been serving as the reviewer in many journals. His primary interest and area of expertise include sports medicine, knee and hip replacement surgery, shockwave medicine and tissue regeneration.

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