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(54) Title: METHOD AND DEVICE FOR TREATING OSTEOARTHRITIS, CARTILAGE DISEASE, DEFECTS AND INJURIES IN THE HUMAN KNEE

(57) Abstract: A method of determining the voltage and current output required for the application of specific and selective electric and electromagnetic signals to diseased articular cartilage in the treatment of osteoarthritis, cartilage defects due to trauma or sports injury, or used as an adjunct with other therapies (cell transplantation, tissueengineered scaffolds, growth factors, etc.) for treating cartilage defects in the human knee joint and a device for delivering such signals to a patient's knee. An analytical model of the human knee is developed whereby the total tissue volume in the human knee may be determined for comparison to the total tissue volume of the diseased tissue in the animal model using electric field and current density histograms. The voltage and current output used in the animal model is scaled based on the ratio of the total tissue volume of the diseased tissue of the human to the total tissue volume of the diseased tissue in the animal model and the resulting field is applied to the diseased tissue of the human using at least two electrodes applied to the knee or a coil or solenoid placed around the knee. The voltage of the signal applied to the electrodes, coil or solenoid is varied based on the size of the knee joint; larger knee joints require larger voltages to generate the effective electric field.



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