
# OSTEOCHONDRAL ALLOGRAFT IN TREATMENT OF KNEE ARTICULAR CARTILAGE INJURIES

*A Systematic Article Review*

Submitted for partial fulfillment of Master Degree in Orthopedic Surgery

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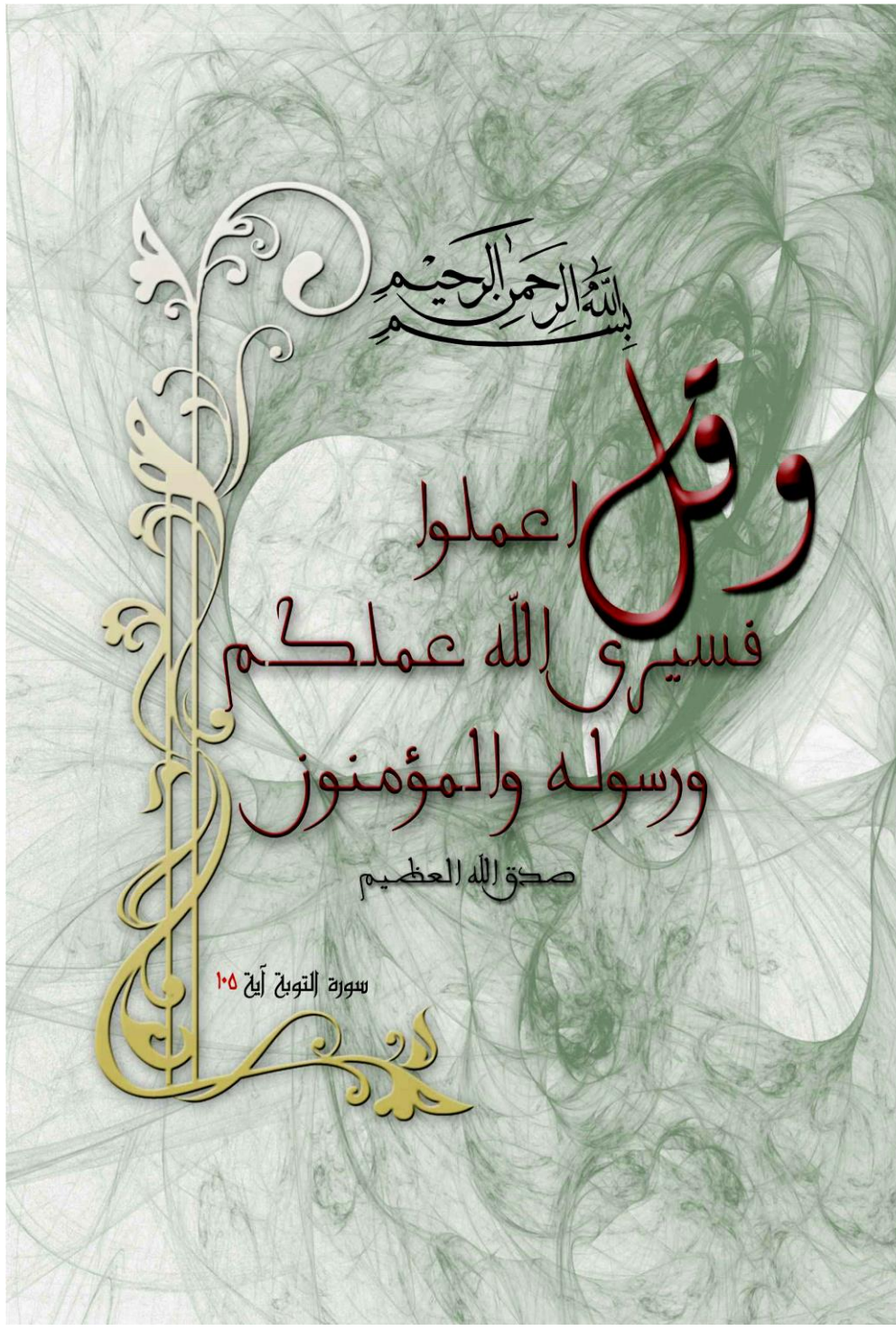
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# List of Abbreviations

| Abbrev. | Meaning |
|---|---|
| AATB | American Association of Tissue Banks |
| ACI | Autologous chondrocyte implantation |
| ACL | Anterior Cruciate Ligament |
| ACR | American College of Rheumatology |
| AP | Anterior-posterior |
| AVN | Avascular necrosis |
| BMI | Body mass index |
| CPM | Continuous passive motion |
| ECM | Extracellular matrix |
| FDA | Food and Drug Administration |
| HA | Hyaluronic acid |
| HLA | Human leukocyte antigen |
| ICRS | International Cartilage Repair Society |
| IKDC | International Knee Documentation Committee |
| KAOS | Knee Arthroscopy Osteoarthritis Scale |
| KOOS | Knee injury and osteoarthritis outcome score |
| LFC | lateral femoral condyle |
| MFC | Medial femoral condyle |
| MRI | Magnetic resonance imaging |
| NA | not available |

| | |
|---|---|
| **OA** | **Osteoarthritis** |
| **OAT** | **osteochondral autologus transplantation** |
| **OCA** | **Osteochondral allograft** |
| **OCD** | **Osteochondritis dissecan** |
| **PA** | **Posterior-anterior** |
| **PCL** | **Posterior Cruciate Ligament** |
| **PG** | **Proteoglycan** |
| **SF-36** | **Short Form-36** |
| **SFA** | **French Society of Arthroscopy** |
| **TENS** | **transcutaneous electric nerve stimulation** |
| **VAS** | **Visual analogue scale** |

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# INTRODUCTION

The articular cartilage is a viscoelastic material by depending on the composition of the cartilage in human body, it is classified into fibrocartilage, fibroelastic and hyaline cartilage that allows variable load bearing and gliding surfaces of synovial joint by the knee during daily functional and athletic activities with stress reduction to the subchondral bone and minimization of friction of the articular surface[1]. Articular cartilage provides joint surfaces with low friction gliding surface, acts as a shock absorber and minimizes peak pressures on the subcondral bone wear characteristics that are required for repetitive motion, allowing the athlete to perform consistently at the highest levels of activity and performance without symptoms elicited from the knee joint[2].

A thorough history should be focused on to figure out the location, duration, and onset of symptoms. Physical examination should evaluate for the presence of knee swelling, mechanical symptoms and concomitant instability. Focal cartilage defects can have a significant impact on patient's quality of life or their ability to play sport [3].

Osteochondral lesions are common and typically affect a young, athletic population. It most commonly occurs about the knee, affecting the lateral aspect of the medial femoral condyle followed by the weight bearing surface of the lateral femoral condyle and less commonly affects the inferomedial pole of the patella and trochlear fossa [4].

Osteochondral lesion is best delineated by MRI. Radiography may be helpful for identifying these lesions but provides little information regarding prognosis and the potential need for orthopedic intervention. MRI features that suggest instability and therefore may be indications for orthopedic intervention include the presence of intra articular loose bodies, overlying articular cartilage thinning, fluid insinuation between the fragment and parent bone and junction cysts between the fragment and parent bone. Arthrography with contrast media is another method of investigations and lastly the arthroscopy is the most diagnostic one [5].

When evaluating a patient for chondral or osteochondral lesion, it is important to appreciate the functional unit of articular cartilage including alignment

(limb and patellofemoral), meniscal integrity, and ligamentous stability. Mal-alignment, loss of meniscal integrity, or ligamentous instability will increase the load on the chondral surface and may worsen existing defects and/or prevent successful repair or restoration. If articular cartilage loses the ability to adapt to repetitive stresses and loss of athletic performance may be followed by the development of chondropenia and ultimately OA. Failure to recognize these injuries can result in long-term disability [6].

The articular cartilage's capacity for repair is limited: partial-thickness defects in the articular cartilage do not heal spontaneously and injuries of the articular cartilage tend to lead to deterioration of the articular surface even that fail to penetrate subchondral bone due to articular cartilage is a neural, avascular and a lymphatic structure[7].

The primary goals of treatment are enhancing the healing potential of subchondral bone, fixing the unstable fragments while maintaining joint congruity and replacing the damaged bone and cartilage with implanted tissues or cells that can grow cartilage[8].

Multiple cartilage repair techniques including loose fragment fixation, debridement, microfracture, OAT, ACI

and prosthetic resurfacing have been suggested as possible treatment modalities for various cartilage disorders[9].

Treatment of cartilage lesions in the young and active population can be challenging, and different options are currently available. OAT has been performed for approximately 3 decades, and encouraging clinical results have been reported [10].

Osteochondral allografts are most commonly implanted for femoral condyle defects, but they also can be implanted in the tibial plateau, the femoral trochlea, and the patella; moreover, case series have reported their use in more than 1 area of the knee in the same setting. To improve clinical results, OAT can be performed in combination with other procedures such as osteotomy, meniscal allograft transplantation, and ligament reconstruction [11].

Many factors influence the outcome after osteochondral allograft transplantation, which can be related to the patient, to the allograft itself, or to the surgical technique; most of the basic research has been focused on chondrocyte viability and the biomechanical properties of the extracellular matrix of the cartilage and