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Bone Marrow Aspirate Concentrate Injection vs. Surgical Reconstruction in the Treatment of Acute Anterior Cruciate Ligament Tears

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Background

- Anterior Cruciate Ligament (ACL) injuries are prevalent in the United States and are associated with poor quality of life and decreased physical activity¹
- Use of surgical intervention for the treatment of ACL injuries carries a myriad of challenges for patients including but not limited to high cost of treatment as well as an increased risk of developing secondary osteoarthritis^{2,3}
- Given these difficulties associated with the application of surgical intervention in the treatment of acute ACL tears, more and more patients are looking for less invasive, cost-effective treatment modalities including the application of autologous stem cell treatment
- While physicians have begun to offer more autologous stem cell treatment modalities to patients who have experienced acute ACL tears, there is still a lack of quality research that demonstrates the efficacy of these therapies, thus indicating the need for more thorough studies that evaluate the effectiveness of this regenerative orthobiologic technology
- Bone Marrow Aspirate Concentrate has risen as a potential viable option for patients interested in regenerative, less invasive treatment of knee pathologies⁴

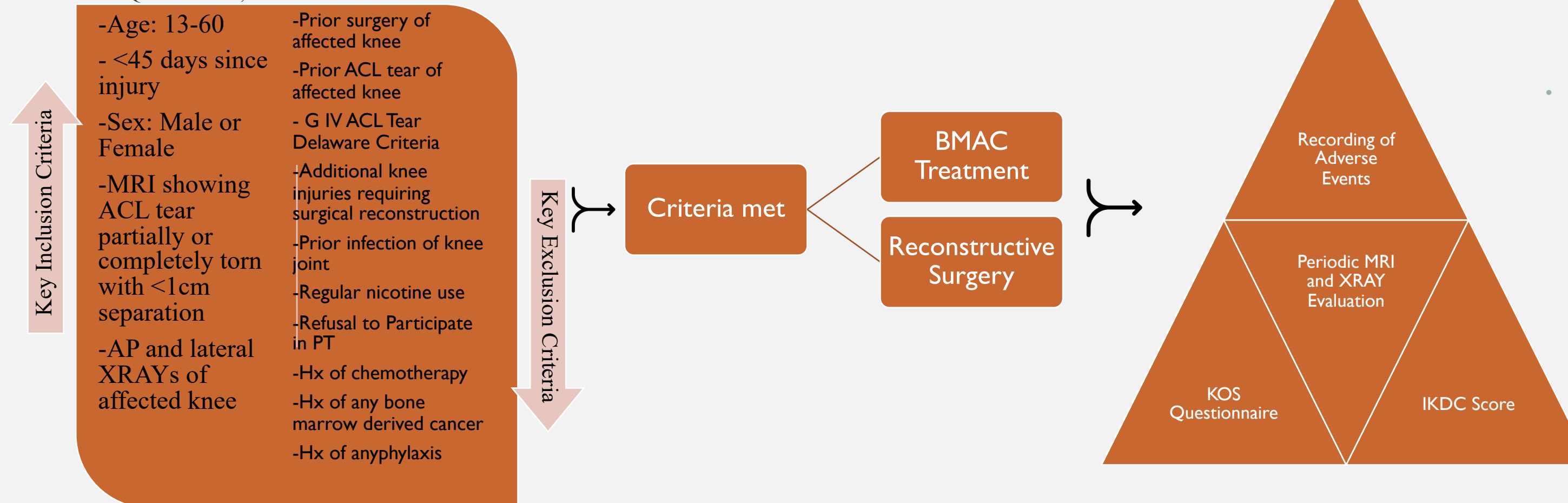
Objectives

- This study has been designed to analyze the efficacy of Bone Marrow Aspirate Concentrate (BMAC) in the treatment of acute ACL tears in comparison with the application of surgical reconstruction
- This study has four concrete goals:

Goal I	• Compare Function in a BMAC treatment group and surgical reconstruction control group with a Knee Injury and Osteoarthritis Outcome Score (KOOS) ⁵ and an International Knee Documentation (IKDC) score
Goal II	• To Compare post treatment MRI's at six months and one year in order to assess grade tear
Goal III	• To compare X-Rays at baseline and ten years to assess for OA by standards of Kellgren-Lawrence classification of knee osteoarthritis
Goal IV	• To compare adverse events periodically following operations/procedures

Materials and Methods

- Patients recruited through UC Davis Medical Center or Shriners Hospital based on history of recent knee injury and finding of ACL tear < 1cm in length by MRI
- Offered BMAC injection or surgical reconstruction if meeting listed criteria below
- Evaluated progressively over ten-year period using MRI and XRAY imaging, recording of adverse events, subjective patient evaluation with a KOOS Questionnaire, and IKDC score



Preliminary Results

- As the study is currently in progress, preliminary results for the first enrolled patient in the treatment group, a young skier with acute ACL tear injury, are shown below including MRI's, updated KOS questionnaire response breakdown and comparative IKDC scale results

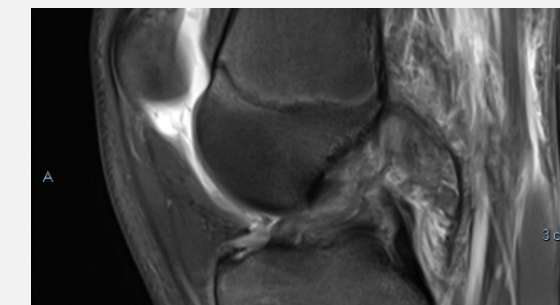
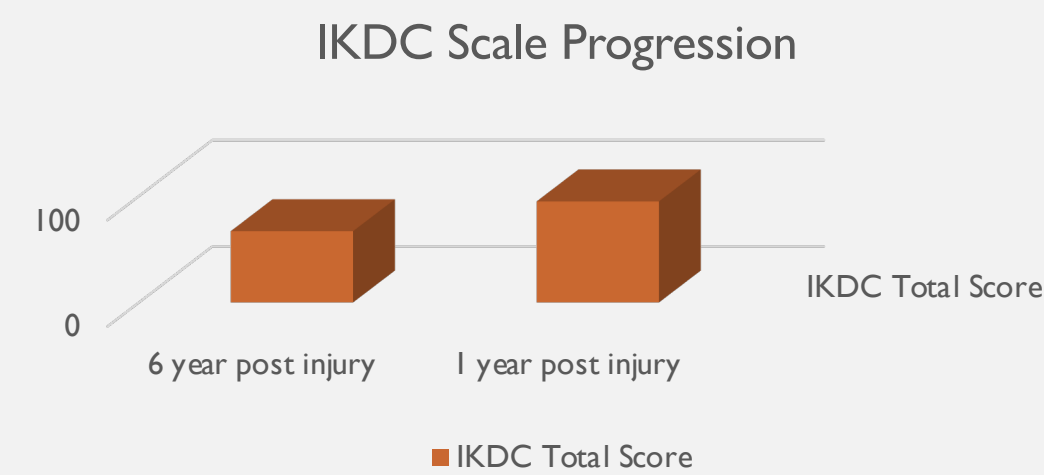
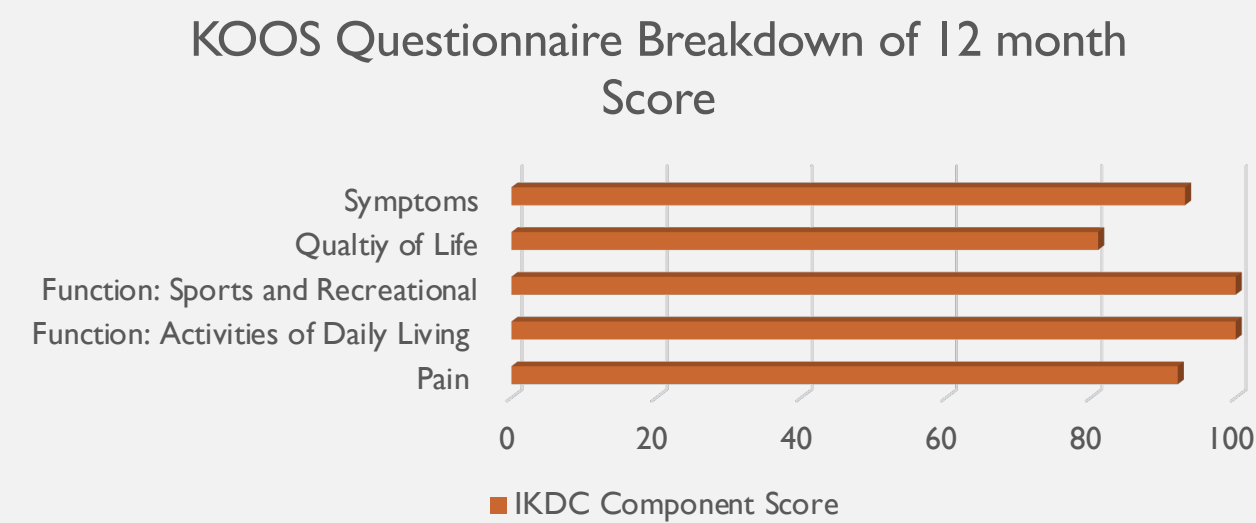


Figure 1: MRI taken within first month of injury

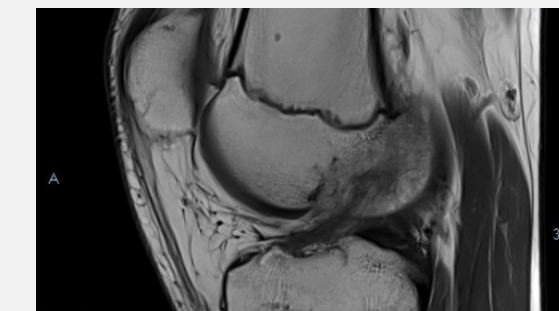


Figure 2: MRI taken 6 months post treatment

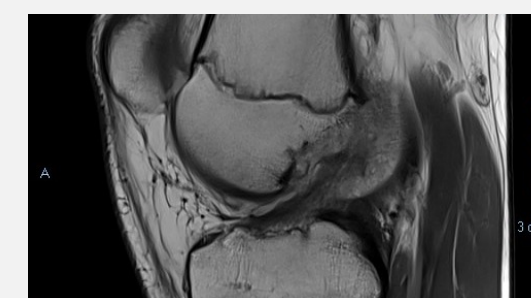


Figure 3: MRI taken 1 year post treatment

Current and Expected Results

- Patient's most recent 12 month KOOS score breakdown of 92, 100, 100, 81, and 93 in categories of Pain, Function: Activities of Daily Living, Function (Sports and Recreational), Quality of Life, and Symptoms, respectively resulted in a cumulative score of 95 (on a scale in which a value of 100 represents no problems)
- Patient's IKDC score showed a remarkable improvement from 6 month to 12 month period with a score improvement from 67 to a 91 (100 again representing no limitation)
- Continuation of this study will involve monitoring of MRI and XRAY imaging with comparisons between treatment and control groups and rating of osteoarthritis based upon Kellgren-Lawrence Classification of XRAY images

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