

## Paper #71

# Landing Strategies of Patients Treated for Cartilage Lesions Along with ACL Reconstruction: An In-Vivo Biomechanical Study

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### Summary:

There is a delayed on restoration of knee kinematics after combined ACL and focal cartilage lesions reconstruction, in demanding tasks

### Abstract:

## Background

The combined anterior cruciate ligament (ACL) rupture and focal cartilage lesions is challenging treatment problem. Cell therapy induced to a biodegradable matrix for chondral lesions alongside with ACL reconstruction is a promising option, but the literature is limited on clinical aspects after these procedures.

## Objectives

The aim of the present study was to investigate the drop landing strategies that patients adopt following the above procedure and compare them to healthy controls, as landing is an important everyday activity which should have stable and pain-free knee.

## Study Design & Methods

Seven male patients (aged 28.3 SD=4.1 years) who were treated for ACL rupture associated with focal cartilage lesion were included to the study. All patients were treated in one stage procedure with arthroscopically assisted ACL reconstruction using hamstrings tendon autograph alongside with autologous culture-expanded mesenchymal stem cells (MSCs) isolated from preharvested abdominal subcutaneous fat and covering with a trimmed-to-fit commercially available biodegradable matrix. Seven male individuals matched to physical characteristics and activity formed the control group for the study. A kinematic and kinetic motion analysis were performed 15.8 (SD=4.3) months after the procedure. A ten-camera motion analysis system and two force platforms were used to collect 3D data during bilateral drop landings from a 40 cm box. Kinetic and kinematic data were collected from three trials. Data were averaged for each individual. A repeated measures analysis of variance was conducted to compare the lower limb biomechanics of the two groups. Statistical significance considered to 0.05.

## Results

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The patients after the ACL and cartilage lesion reconstruction had significantly reduced vertical ground reaction forces of the affected limb comparing to the uninvolved one ( $p=0.02$ ). Their knee range of motion and maximum knee angle was reduced in both legs comparing to the controls ( $p=0.03$  and  $0.05$  respectively), but this reduction was more profound in the affected limb. They had reduced maximum knee moment to the involved limb ( $p=0.04$ ) with increased maximum moment to the hip and ankle joint of the uninvolved one ( $p=0.05$  and  $0.015$  respectively).

### Conclusions

Sixteen months following ACL reconstruction combined with MSCs implanation, the patients still try to protect their affected limb during landing by altering the kinetics and kinematics of both their limbs.

Keywords: Stem Cells, Kinetic, Kinematic, ACL, Gait Analysis