The prevalence and biomechanical role of meniscal tears associated with anterior cruciate ligament rupture: prospective study on 213 cases.

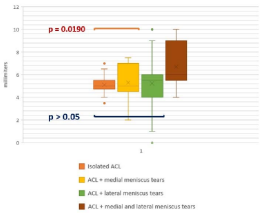
Arcangelo Russo, Calogero Di Naro, Gianluca Zocco[1], Rosario Cutaia, Luigi Fanzone, Francesco Pegreffi[2], Giuseppe Gianluca Costa
[1]Public Hospital Umberto I Enna Sicily Italy, [2]Kore University of Enna

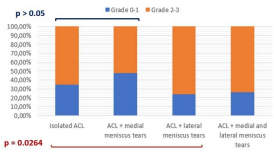
INTRODUCTION:
There is robust evidence in literature reporting the role of menisci not only as “shock absorbers” but also fundamental players in knee stability. However, this evidence is derived from biomechanics investigation, whereas there is paucity of literature supporting such findings in clinical settings. The aim of this study is to evaluate the prevalence of meniscus tears associated to anterior cruciate ligament (ACL) injury and the impact of such lesions on antero-posterior and rotatory knee stability.

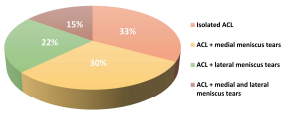
METHODS: This prospective study involved 213 patients who underwent an arthroscopic ACL reconstruction in a time lapse of 36 months. Based on the arthroscopic findings and the type of the performed treatment, patients were classified into the following 4 groups: 1) isolated ACL injury, 2) ACL injury plus medial meniscus tears, 3) ACL injury plus lateral meniscus tears, 4) ACL injury plus combined medial and lateral meniscus tears. Demographic features (age, BMI, gender), sport activity level (according to the Tegner score), time between injury and treatment, prevalence of Lachman test grade ≥ 2, prevalence of pivot shift ≥ 2 and side-to-side arthrometric value using KT1000 were preoperatively collected. The student T test or the Chi square test were used for comparison, where appropriate. A $p < 0.05$ was defined as statistically significant.

RESULTS:
The cohort study included 31 female and 182 male patients, with a mean age of 26.1 ± 9.8 years at surgery and mean BMI of 24.1 ± 3.8. The mean preinjury Tegner Activity Level was 7.1 ± 1.9, with 51 competitive or professional athletes. Associated meniscal tears were found in 143 out of 213 cases (67.1%), with 64 cases of associated medial meniscus lesions, 47 cases of concomitant lateral meniscus lesions and 32 cases of combined medial plus lateral meniscus lesions. Patients with associated medial meniscus tears presented significantly higher age, BMI, time from injury when compared with patients who sustained an isolated ACL tear. Conversely, patients with concomitant lateral meniscus tears had significant higher BMI when compared to patients with isolated ACL tears, but no significantly increased age and time from injury. Patients with concomitant medial meniscus tears had greater rates of Lachman test grade ≥ 2 and greater side-to-side KT1000 values (5,49 ± 1,47) when compared to isolated tears (5 ± 0,85, p=0.0190), but comparable rates of pivot shift grade ≥ 2. Patients with concomitant lateral meniscus tears presented higher rates of pivot shift grade ≥ 2 (p =0.0264), but not statistically significant differences in terms of side-to-side KT1000 values or rates of Lachman test grade ≥ 2. Patients with combined medial plus lateral meniscus tears had significantly higher KT1000 values (6,55 ± 1,76) compared not only to isolated ACL tears (p<0.0001), but also to concomitant medial meniscus tears (p=0.0025) and concomitant lateral meniscus tears (p=0.0029).

DISCUSSION AND CONCLUSION:
The findings of this study underline the contribution of concomitant meniscal lesions to knee laxity. In particular, concomitant medial meniscus lesions determine a significant increase of the anterior tibial translation compared to knees without meniscus tears, whereas lateral meniscus tears seem to greatly impact on rotatory stability. In patients with severe instability, particular attention is recommended in order to identify and promptly treat such injuries, with the aim to restore joint kinematics as close as possible to native status.







	Gender (male prevalence)	Age	BMI	Time from injury	Tegner score
Isolated ACL	88.6%	23.4 ± 6.9	22.1 ± 1.7	38.3 ± 42.3	7.7 ± 1.9
ACL + medial meniscus tears	92.1%	28.8 ± 11.4	25.5 ± 4.2	124.7 ± 196	7.1 ± 1.9
ACL + lateral meniscus tears	89.4%	24.5 ± 9.4	23.7 ± 4.3	58 ± 84.7	6.8 ± 2.1
ACL + medial and lateral meniscus tears	84.4%	27.3 ± 9.7	25 ± 3.9	104.3 ± 155.4	7 ± 2.2