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Conservative Treatment of Ruptured ACL: A Prospective Study of Controlled ACL Healing with Fully Restored Anatomy and Function in Patients Pre-Selected by Diffusion–Weighted MRI – Continuation of the Study

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Summary:
With over 3 years follow-up and a larger series of patients, the continuation of our study shows that in cases of ACL full rupture with no displacement of ligament fibres, a splint-based conservative treatment yields the same rate (more than 80%) of anatomical and functional restoration of the ACL in all cases and this rate remains stable in time.

Abstract:
PURPOSE
With over 3 years follow-up and a larger series of patients, we sought to assess the evolution of the results obtained in the preliminary prospective study presented at the ISAKOS congress in 2009. The preliminary study demonstrated the healing potential of fully ruptured ACLs with no displacement of ligament fibres, managed with a specific conservative treatment.

MATERIALS & METHODS
From 2007 to 2012, after an initial clinical examination (objective IKDC), we selected the cases of fully ruptured ACL with no displacement of ligament fibres using diffusion-weighted MRI sequences. The diffusion-weighted MRI sequences were applied to the knee to locate the ruptured ACL fibres precisely within the post-traumatic oedematous infiltrate.
The patients' knees were placed in a (load-bearing) splint for 6 weeks, with an ROM of 30° to 60° flexion. the continuity of the ligament was checked on MRI. Progressive rehabilitation of the knee was then started. Ten months after the initial trauma a clinical examination (objective IKDC), stress radiography using a TELOS device and an MRI were performed to assess the functional status and anatomical aspect of the ligaments. The patients were examined once again over 3 years to check their healed ACL and given a clinical examination (objective IKDC and KT-1000) by two different physicians, a GNRB laximetry test and a functional evaluation (subjective IKDC, KOOS and Tegner score).

RESULTS
Currently the 90 first cases of fully ruptured ACL with no displacement of ligament fibres (24 patients in 2009) were re-examined over 3 years after the traumatic injury (mean = 4 years and 4 months). These patients were 42 females, 48 males; ages ranging from 15 to 67, mean 31,6; mean time between trauma and diagnosis : 8.6 days. 73 patients (i.e. 81.1% versus 83% in 2009) showed fully-restored ACL anatomy on distance MRIs. 66 patients (i.e. 73,3%) showed full healing of the ACL : normal or subnormal clinical examination (objective ligamentary IKDC: 20 patients stage A, 46

patients stage B), normal functional assessment (weighted subjective IKDC ranging from 74,7 to 100, mean 88,2 ; TELOS side-to-side differences ranging from -1 to 6mm, mean 2,1mm; KT-1000 side-to-side difference at maximum pressure ranging from -1 to 6mm, mean 2,3 mm; the different items of the KOOS score between 82.7 and 97.6 on average). Seven patients (i.e. 7.8%) presented with significant residual clinical laxity (objective IKDC stage C) although this had no functional impact (subjective IKDC, KOOS and Tegner). The 17 failures included 4 ACLs replaced by non-functional scar tissue, 7 cases of non healing and 6 rupture recurrences; 12 cases were revised with ACL reconstruction.

CONCLUSION

With over 3 years follow-up and a larger series of patients, the continuation of our study shows that in cases of ACL full rupture with no displacement of ligament fibres, a splint-based conservative treatment yields the same rate (more than 80%) of anatomical and functional restoration of the ACL in all cases and this rate remains stable in time. However, such patients must be pre-selected using diffusion-weighted MRI sequences applied to the knee.