

## Prospective Evaluation on the Incidence of Secondary Meniscus and Cartilage Injuries Following Non-Operative Treatment of Anterior Cruciate Ligament Injuries in Skeletally Immature Children Using 3.0T MRI

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### Summary:

In this prospective cohort study the incidence of secondary meniscus and cartilage injuries was found to be low (4.8%) in 40 skeletally immature children with a primary non-operatively treated ACL rupture over a period of 1.7 years ( $\pm 0.1$  years), using 3.0T MR images reviewed by two independent MRI-radiologists.

### Abstract:

#### Introduction:

There is solid evidence that persons with a rupture of the anterior cruciate ligament (ACL) will have increased risk of knee osteoarthritis in the long term, and that additional injury to menisci and cartilage further increase the risk. The prevalence of meniscus injuries in skeletally immature children who undergo early ACL reconstruction is reported between 35% and 69%. No prospective study has investigated whether advocating a non-operative treatment algorithm for children with ACL rupture will lead to an increase of secondary injuries. The purpose of this study was to prospectively investigate the incidence of new meniscus and cartilage injuries in skeletally immature children with a known ACL rupture. The uninjured knee of the children was the control knee.

#### Material & Methods:

Forty consecutive skeletally immature children were enrolled in a prospective cohort study. The inclusion criteria were a traumatic ACL injury in a child with open physis sustained at age 12 years of age and younger. Fourteen girls (35%) and 26 boys (65%) with an average age of 11.0 years ( $\pm 1.4$  years) at the time of injury were examined using 3.0T MRI of both knees at two occasions; MRI1: 2.2 years ( $\pm 1.4$  years) after injury, and MRI2: 1.7 years ( $\pm 0.1$  years) after MRI1. The images were read by two independent MRI-radiologists. The prevalence and incidence of meniscus and cartilage injuries were calculated using SPSS.

#### Results:

The prevalence of meniscus and cartilage injuries in knees with ACL rupture was 39.0% (medial, n=6; lateral, n=7; medial + lateral, n=3) and 12.2% respectively at MRI1, and 41.5% (medial, n=7; lateral, n=7; medial + lateral, n=3) and 12.2% at MRI2. The incidence of new meniscus injuries was 4.8% (1 new medial and 1 new lateral, while 1 lateral was normalized). At MRI1 10 (24.4%) knees had undergone ACL reconstruction, and at MRI2 13 (31.7%) were reconstructed. The prevalence of meniscus and cartilage injuries in the contralateral knee was 10.3% and 2.6%, respectively at MRI1, and 10.3% and 5.1% at MRI2. The incidence of new meniscus injuries in the contralateral knee was zero, while the incidence of new cartilage injuries was 2.5%.

#### Conclusion:

The incidence of new meniscus and cartilage injuries was low in ACL injured knees over a period of 1.7 years in skeletally immature children. The overall prevalence of meniscus injuries was comparable to previous studies. The results of the present study suggest that a non-operative treatment algorithm should be considered for skeletally

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immature children with ACL rupture, with regard to the incidence of secondary meniscus and cartilage injuries.