



Disponible en ligne sur

ScienceDirect
www.sciencedirect.com

Elsevier Masson France

EM|consulte
www.em-consulte.com



Anterior cruciate ligament tears in children[☆]



Lésions du ligament croisé antérieur chez l'enfant

S. Herman^{a,b,*}, N. Lefevre^{a,b}, Y. Bohu^{a,b}

^a IAL Nollet, 23, rue Brochant, 75017 Paris, France

^b Clinique Paris V, 36, boulevard Saint-Marcel, 75013 Paris, France

Available online 14 October 2014

Introduction

In the last twenty years, publications concerning anterior cruciate ligament (ACL) injuries in children have multiplied, attempting to define the optimal therapeutic management of an injury that is becoming more and more frequent over the years with the development of sport activities, not only for leisure but also at elite level (as proof in France with the onset of Sport study colleges, sport training centres, and athlete training centres).

The ACL injury in children occurs essentially during sport accidents. Unless one has a child captivated by video games and Internet, these turbulent and sporting children have daily physical activities (during recreation at school or in playgrounds), pivoting sport, or pivoting-contact sport, and they rarely follow the recommendations of prudence that therapeutic may give, once the acute episode has passed. In children, the notion of a knee giving way appears as an epiphenomenon to which they pay little attention so long as it concerns a minor accident of instability, without signifi-

cant functional consequence, however, creating the risk of subsequent meniscal and subsequent cartilage injuries.

Surgical management of such injuries has become obvious with the dogma of the preservation of the meniscal capital that is even more pertinent than in an adult. This surgical management must take into account the residual potential of the knee growth.

Epidemiology

The participation of children in sporting events is constantly increasing.

In the States, a survey estimated as 4.3 million the number of school children admitted to an emergency unit for injury related to sport, between July 2000 and June 2001, figures to be compared with the participation of 44 million children in sporting events in 2008 [1].

According to McCarroll et al. [2], 3% of ACL injuries operated on concerned children under the age of 16.

Also in the States, in children aged 5 to 18 (6 million players/year), Shea et al. [3] showed that 6.7% of traumas when playing football affected the ACL, nearly a third of the traumatic knee injuries in this game (these facts led to prevention programmes associating neuromuscular reprogramming exercises, proprioception, and pliometrics, particularly efficient decreasing five- to seven-fold the risk of ACL injuries when practicing sport, specially in female soccer).

DOI of original article:

<http://dx.doi.org/10.1016/j.jts.2012.01.012>.

[☆] This article was originally published in French language in *Journal de Traumatologie du Sport* 2012;29:50–60. <http://dx.doi.org/10.1016/j.jts.2012.01.012>.

* Corresponding author.

E-mail address: serge.herman@wanadoo.fr (S. Herman).

<http://dx.doi.org/10.1016/j.jts.2014.08.004>

0762-915X/© 2014 Published by Elsevier Masson SAS.

In the Scandinavian countries [4], the frequency of ACL injuries is estimated to be one per 100 000 children per year [5].

In France, during the SOFCOT symposium [6], an epidemiological study carried out in 2005 among four paediatric emergency units (Toulouse, Tours, Lyon and Strasbourg) reported only 712 knee injuries (from a simple sprain to a fracture) out of 24 855 paediatric emergencies, i.e. 3%. In this 3% of knee injuries, 16% corresponded to purely ligament injuries (225 patients). Seventy-six percent of these knee strains are subsequent to sport accidents, football and skiing being the sports for boys, whereas skiing and gym are the principle causes in girls. Regarding the ligament injuries in these 225 children, we noted a proportion of seven injuries of the medial collateral ligament for two injuries of the lateral collateral ligament and one cruciate ligament (i.e. 13%). Among the 26 cases of cruciate ligament damage, the principle mode of an ACL injury remains the bone avulsion of the floor (15 fractures of the tibial spine for 11 purely ACL injuries). This differs slightly from what Bracq et al. [7] reported in their SOO study in 1996, in which the purely ligament injuries were slightly more frequent than avulsions of the floor (55 vs 45%). Age appears as determining the ACL injury: 80% of bone avulsions of the floor occur before the age of 12, whereas 90% of purely ligament injuries occur after the age of 12.

Survey of practice

In the States, the survey of practices conducted by Kocher et al. [8] in 2002 among the members of the Herodius society and the ACL study group (group of surgeons involved in the management of knee sport injuries), revealed that nearly 80% of the surgeons interviewed do not hesitate to perform intra-articular reconstructions of the ACL with a preeminence of the use of the hamstrings for this reconstruction, whatever the age of the child (after the age of 8). Eleven percent of the American surgeons interviewed were confronted with subsequent growth problems (12 cases reported).

In France, the survey of practices conducted during the symposium in November 2006 [6] indicate the occurrence of 350 to 400/year ACL injuries, 150 of which underwent surgery. We may therefore estimate that we are faced with (depending on our specialisation in sports traumatology or not, surgeons or physicians) this problem one to five or six times on average per year.

Natural outcome of an ACL injury in children

Most of the time, the natural reflex of the paediatric doctors, sports physicians and orthopaedic surgeons (in paediatrics or adults) prone the solution of waiting before envisaging a radical treatment at the end of growth, because of the potential risks of techniques that we usually use in adults regarding the residual growth of the knee. The frequency of meniscal injuries during the initial accident may still today lead to irreparable damage, notably a meniscectomy on a unstable knee, even if the negative prognosis of the natural outcome of an ACL injury in children is, today, recognised by most.

Concerning the evolution over time of the knee's stability, according [9,10] to the treatment applied, Seil [4] in a meta-analysis of the literature in 2001, regarding 458 ACL tears collected in prepubertal immature skeletons, report:

- in attempt of bone maturity, conservative treatment (prudence recommendations, limitation of sport activities, with or without protection orthosis) does not prevent instability accidents in 92% of cases;
- despite the legendary healing capacity of children, the simple suturing of the torn ACL according to Marchall's technique (15 cases), 73% of unstable knees remain;
- extra-articular ligament plasty while waiting for bone maturity (plasty of Lemaire in France or external tenodesis of the fascia-lata) does not prevent 64% of operated knees to remain unstable;
- the intra-articular reconstruction of the ACL (334 cases, whatever the technique) only leaves 10% of unstable knees.

The same observations had already been noted in the framework of a conservative treatment while awaiting complete growth by:

- Graf et al. [11]: 100% of subsequent instability concerning 12 cases, with a mean follow-up of 2 years;
- Mizuta et al. [12]: 89% of subsequent instability concerning 18 cases, with a mean follow-up of three years.
- A more recent Norwegian study [13] tempers these data slightly with an original management attempting to determine, among a cohort of 28 children aged under 12, those who could potentially continue their activities without an instability accident while waiting for bone maturity. Sixty-five percent of the children tested (hop test, isokinetic assessment) were able to benefit from this interim waiting time (over a mean period of follow-up of three years).

In parallel with persisting secondary instability, frequency of associated meniscal injuries, whether primary (affecting essentially the lateral meniscus) or secondary are noted:

- Graf et al. [11]: 75% of initial meniscal injuries [14];
- Mizuta et al. [12]: 78% of initial meniscal lesions;
- Bonnard et al. [6]: 50% of initial meniscal lesions affecting the lateral slightly more than the medial meniscus;
- Aronowitz et al. [15]: 46% of secondary meniscal injuries;
- Woods and O'Connor [16]: 68% of secondary meniscal injuries.
- In 75% of cases, the secondary meniscal injuries occur during the year following the ACL injury.

Even more serious is the presence of authentic x-ray signs of articular pain regularly worsening over the years of follow-up (3, 6 and 8 years) although these patients are only adolescents:

- Kannus and Jarvinen [17] are the first to have underlined, with a follow-up of 8 years from the initial accident, the existence of x-ray signs of remodeling in 57% of cases;
- Mizuta et al. [12] after 3 years follow-up after the initial accident, with a mean age of 16, revealed 61% of x-ray signs of remodeling, among which 18% of internal femorotibial articular pinching;
- Aichroth et al. [18] after six years of follow-up after the initial accident and a mean age of 18 and a half, 43% of

Download English Version:

<https://daneshyari.com/en/article/4076515>

Download Persian Version:

<https://daneshyari.com/article/4076515>

[Daneshyari.com](https://daneshyari.com)