



Université Claude Bernard



Lyon 1



CHIRURGIE DU SPORT ET INFECTION

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Hospices Civils de Lyon

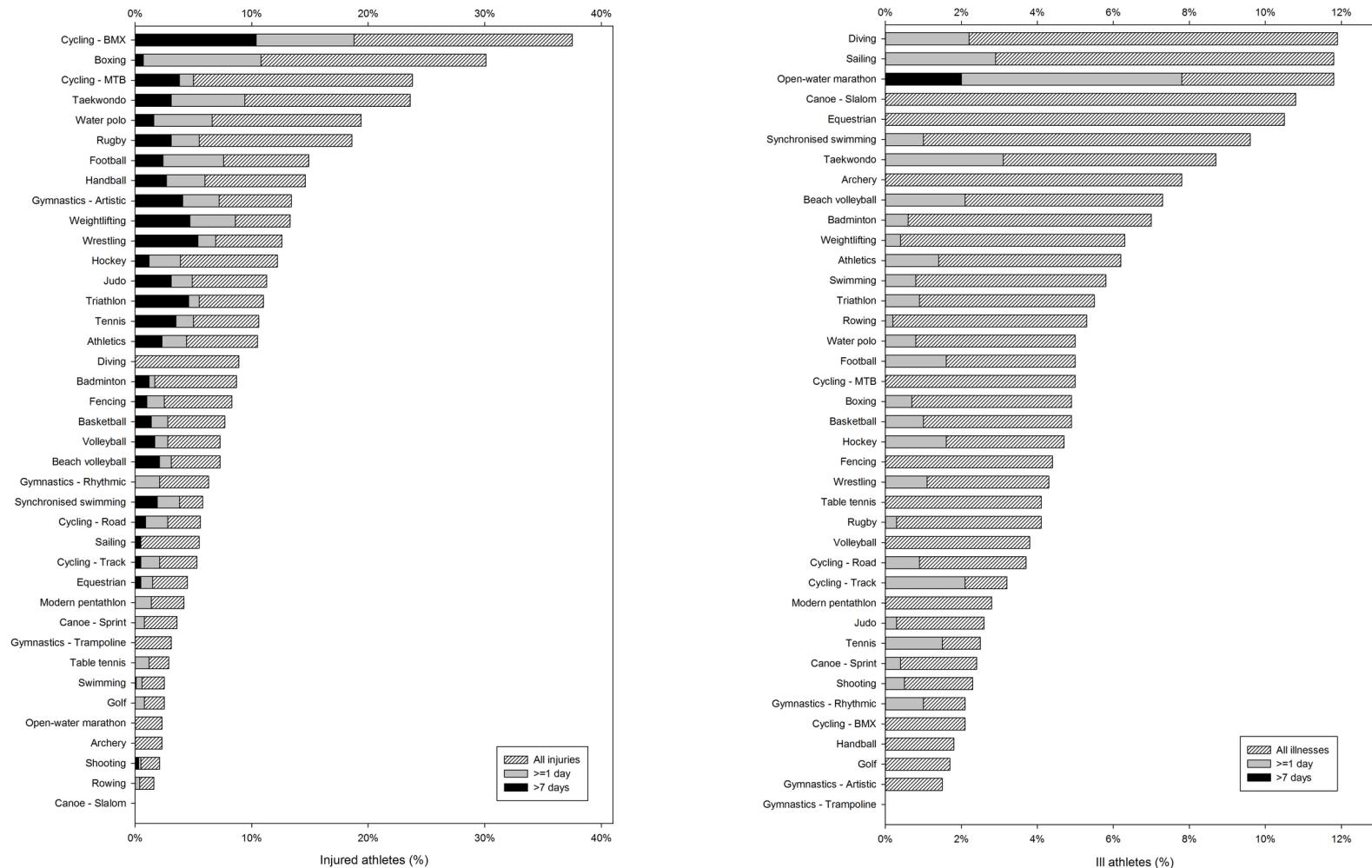


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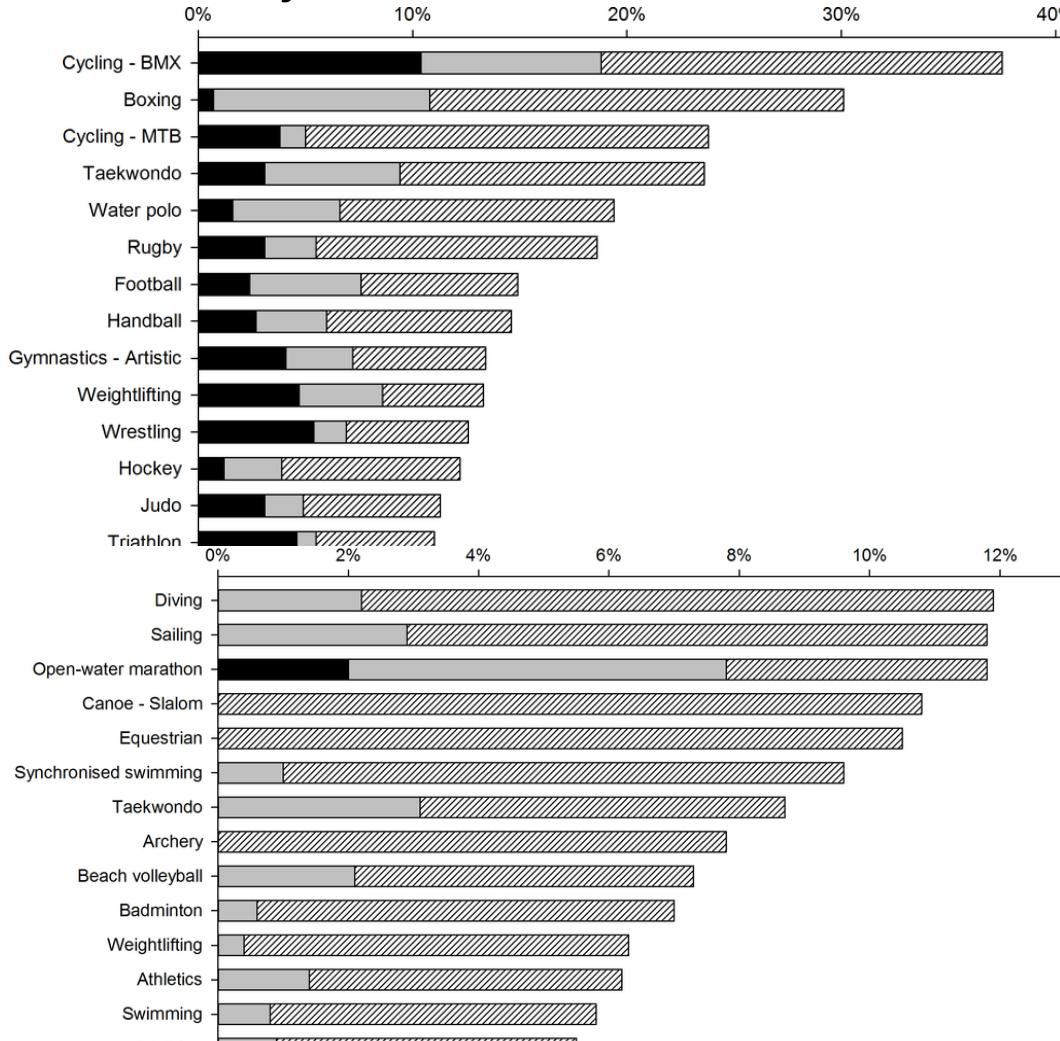
SPORT ET INFECTION?



Sports injury and illness incidence in the Rio de Janeiro 2016 Olympic Summer Games: A prospective study of 11274 athletes from 207 countries



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BMX cycling (38%), boxing (30%), mountain bike cycling (24%), taekwondo (24%), water polo (19%) and rugby (19%) were the sports with the highest incidence of injury. Diving (12%), open-water marathon (12%), sailing (12%), canoe slalom (11%), equestrian (11%) and synchronised swimming (10%) were the sports with the highest illness incidence.

The rate of infectious diseases in Rio was low and consistent with previous Olympic Games.

Sports injury and illness incidence in the Rio de Janeiro 2016 Olympic Summer Games: A prospective study of 11274 athletes from 207 countries

Risque d'infection ?

- 3% (infection) Rio, 3% London, 5% Sochi

Appareil respiratoire (47%)

Appareil Gastrointestinal (21%)

Peau et tissus sous-cutanés (9%)

Risque cutané

Infections virales (herpes, molluscum c.)

Infections bactériennes

Staph aureus

Staph Meti-R

infections fongiques (lutte....)



Risque cutané

Sport de contact Surface

»artificial turf »
Staph aureus MetiR

Morbidité élevée : rasage et
dermabrasion



Colonization With Methicillin-resistant *Staphylococcus aureus* and Risk for Infection Among Asymptomatic Athletes: A Systematic Review and Metaanalysis

Styliani Karanika,^a Tori Kinamon,^a Christos Grigoras, and Eleftherios Mylonakis

Infectious Diseases Division, Warren Alpert Medical School of Brown University, Rhode Island Hospital, Providence

prevalence of MRSA colonization among athletes was 6%

Sports with the highest prevalence :

- wrestling (22%)
- football (8%) ,basketball (8%).

RISQUE INFECTIEUX PLUS IMPORTANT EN CHIRURGIE DU
SPORT?

NON !

RISQUE INFECTIEUX PLUS IMPORTANT CHEZ LE
SPORTIF DE HAUT NIVEAU?

...OUI!

Prevalence of Septic Arthritis After Anterior Cruciate Ligament Reconstruction Among Professional Athletes

Bertrand Sonnery-Cottet,^{*†} MD, Pooler Archbold,[†] MD, Rachad Zayni,[†] MD,
Juliano Bortolotto,[†] MD, Mathieu Thaunat,[†] MD, Thierry Prost,[‡] MD,
Vitor B.C. Padua,[§] MD, and Pierre Chambat,[†] MD

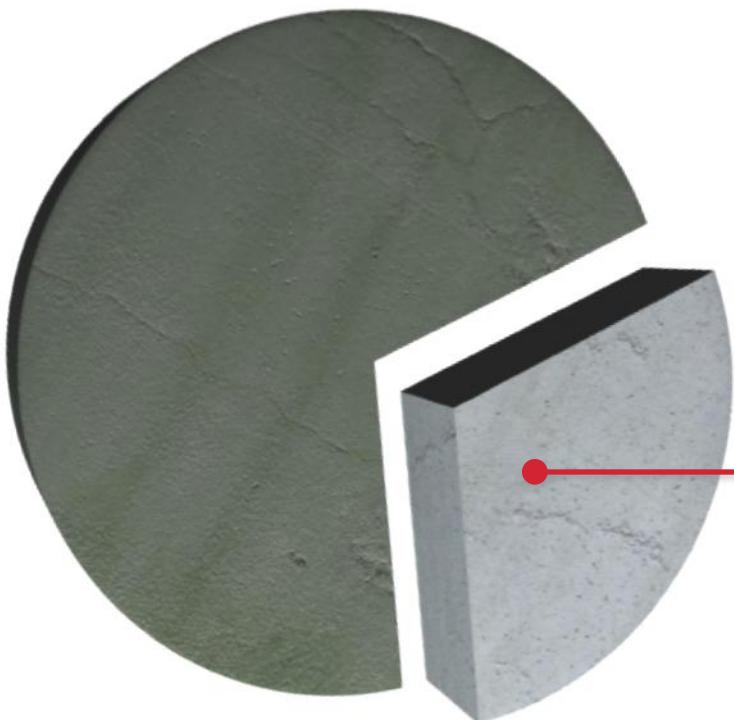
Investigation performed at The Centre Orthopédique Santy, Lyon, France

Retrospective study

n=1957

Higher infection rate in pro athletes + lateral
tenodesis (OR: 4.8) All infections occurred in
outdoor athletes

En pratique les lésions du genou++



- Knee & ligament injuries
- 30% des lésions !!!**

En pratique

Reconstruction du LCA

Study Data					
Study	No. of Knees	No. of Infections	Incidence, %	Mean Age (Range), y	Male, % (No. of Males/Females)
Binnet and Basarir ¹⁰	1231	6	0.49	24.5 (20-32)	100 (6/0)
Burks et al ²⁷	1918	8	0.42	27 (15-40)	75 (6/2)
Fong and Tan ¹⁸	472	7	1.4	23 (19-30)	100 (7/0)
Indelli et al ⁴	3500	5	0.14	32.5 (20-51)	83 (5/1)
Judd et al ²⁵	1615	11	0.68	N/A	N/A
Katz et al ²⁶	801	6	0.75	27.3 (16-61)	N/A
Sajovic et al ¹²	1283	3	0.23	31 (23-48)	100 (3/0)
Schollin-Borg et al ³⁵	575	10	1.7	28.3 (19-39)	80 (8/2)
Schub et al ²⁰	831	4	0.48	26 (20-34)	100 (4/0)
Schulz et al ²⁹	512	4	0.78	35.5 (17-56)	79 (19/5)
Van Tongel et al ⁵	1736	15	0.51	31.8 (18-50)	93 (14/1)
Viola et al ²⁸	1794	14	0.78	21 (17-29)	100 (14/0)
Wang et al ⁶	4068	21	0.52	28.6 (16-58)	85 (18/3)
Williams et al ²	2500	7	0.3	31.3 (17-50)	100 (7/0)
Total	22,836	121	0.5	28.9 (15-61)	88 (111/14)

Overall incidence : 0.3% to 1.7%

Mouzopoulos et al KSSTA 2009, Kim et al Orthopaedics 2014

facteurs de risque?

Factors Associated with Infection Following Anterior Cruciate Ligament Reconstruction

Robert H. Brophy, MD, Rick W. Wright, MD, Laura J. Huston, MS,
Samuel K. Nwosu, MS, the MOON Knee Group*, and Kurt P. Spindler, MD

*Investigation performed at Washington University School of Medicine, St. Louis, Missouri,
and Vanderbilt University Medical Center, Nashville, Tennessee*

Characteristic	Odds Ratio	95% CI	P Value
Age	0.956	0.91-1.01	0.106
BMI	0.977	0.87-1.09	0.680
Diabetes mellitus	18.807	3.76-93.97	<0.001
Smoker	2.541	0.68-9.55	0.167
Graft type, relative to BTB autograft			
Hamstring autograft	4.631	1.20-17.91	0.026
Other	4.295	1.02-18.11	0.047

facteurs de risque?

Effect of Graft Selection on the Incidence of Postoperative Infection in Anterior Cruciate Ligament Reconstruction

Joseph U. Barker,* MD, Mark C. Drakos, MD, Travis G. Maak, MD, Russell F. Warren, MD, Riley J. Williams III, MD, and Answorth A. Allen, MD

- n=3126, 0.58% sepsis
IJ incidence +++ infection
ablation de la greffe +
- n=10626, 0.48% sepsis
Risque 8.2 x avec IJ vs BPTB



Barker et al Am J Sports Med 2010
Maletis et al Am J Sports Med 2013

Prevention?

»Bain de Vancomycine »

- Retrospective study
n=285, AB iv (prophylaxie)

n=780, AB iv (prophylaxie)+
Bain de vancomycine

Reduced rate of infection in the vanco group

A Surgical Technique Using Presoaked Vancomycin Hamstring Grafts to Decrease the Risk of Infection After Anterior Cruciate Ligament Reconstruction

Christopher J. Vertullo, M.B.B.S., F.R.A.C.S, F.A.Orth.A., Mark Quick, M.B.B.S., B.Sc., Andrew Jones, M.B.B.S., F.R.A.C.P., F.R.C.P.A., and Jane E. Grayson, Ph.D.

- RCT study
n=810 group no ATB
n= 704 group ATB
Both groups received iv prophylactic antibiotic Reduced infection rate in the vanco group

Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-014-3438-y

KNEE

Autograft soaking in vancomycin reduces the risk of infection after anterior cruciate ligament reconstruction

Daniel Pérez-Prieto · Raúl Torres-Claramunt ·
Pablo E. Gelber · Tamer M. A. Shehata ·
Xavier Pelfort · Joan Carles Monllau

Barker et al Am J Sports Med 2010
Maletis et al Am J Sports Med 2013

Tabac?

Tobacco Use Is Associated With Increased Complications After Anterior Cruciate Ligament Reconstruction

Jourdan M. Cancienne,* MD, F. Winston Gwathmey,* MD,
Mark D. Miller,* MD, and Brian C. Werner,*† MD

Investigation performed at the University of Virginia Health System, Charlottesville, Virginia, USA

Conclusion: ACL reconstruction in patients who use tobacco is associated with significantly increased rates of infection, VTE, and subsequent ACL reconstruction compared with controls. There was no association between tobacco use and postoperative arthrofibrosis after primary ACL reconstruction.

Etude de cohorte

n=13358

Odds ratio: 2.3 arthrite septique

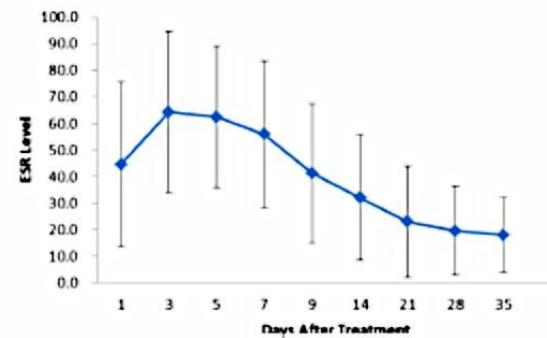
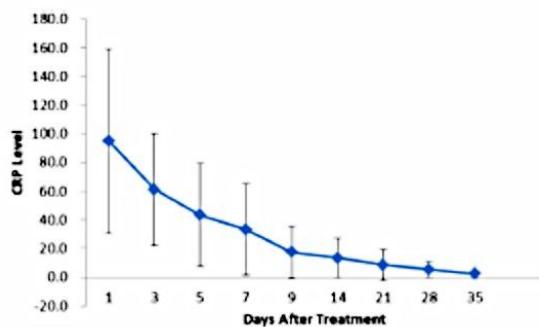
Diagnostic

- Douleur
- Diminution des mobilités
- ...Signes « frustres » d'arthrite
- Biologie +++

Diagnostic

C-Reactive Protein and Erythrocyte Sedimentation Rate Changes After Arthroscopic Anterior Cruciate Ligament Reconstruction: Guideline to Diagnose and Monitor Postoperative Infection

Cheng Wang, M.D., Yingfang Ao, M.D., Xiaohua Fan, M.D., Jianquan Wang, M.D., Guoqing Cui, M.D., Yuelin Hu, M.D., and Jiakuo Yu, M.D.



Conclusions: Both CRP and ESR were helpful in determining the presence of a normal or septic joint. The threshold values of 41 mg/L for CRP and 32 mm/h for ESR had the most optimal sensitivity and specificity. The peak CRP level occurred earlier than the peak ESR level after treatment of postoperative infection and returned to normal more quickly. In this study CRP was more useful than ESR to evaluate the response of infection to treatment.

Traitement

- Arthroskopie lavage (ou à ciel ouvert)?
- Matériel
- Antibiothérapie
 - *Staphylococcus epidermidis* (41%)
 - *Staphylococcus aureus* (35%)

Traitemet

Pathogens in ACL Reconstruction

Study	No.													Total
	SE	SA	ST	PS	PA	EF	SH	SW	SM	CO	EC	EA	Mu	
Binnet and Basarir ¹⁰	0	3	0	1	0	0	0	0	0	0	0	0	0	4
Burks et al ²⁷	0	3	0	1	0	0	0	0	0	0	0	0	0	4
Fong and Tan ¹⁸	0	3	2	0	0	0	0	0	0	0	0	0	2	7
Indelli et al ⁴	2	3	1	0	0	0	0	0	0	0	0	0	0	6
Judd et al ²⁵	8	1	0	0	1	0	0	0	0	0	0	1	0	11
Katz et al ²⁶	4	0	0	0	0	0	0	0	0	0	0	0	2	6
Sajovic et al ¹²	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Schollin-Borg et al ³⁵	6	1	0	0	1	0	0	0	0	0	0	0	0	8
Schub et al ²⁰	0	4	0	0	0	0	0	0	0	0	0	0	0	4
Schulz et al ²⁹	5	12	2	0	0	0	0	1	0	0	0	0	0	20
Van Tongel et al ⁵	8	1	1	0	0	1	0	0	0	0	1	0	2	14
Viola et al ²⁸	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Wang et al ⁶	9	2	0	0	0	1	1	0	1	1	0	0	1	16
Williams et al ²	1	4	0	0	0	0	0	0	0	0	0	0	2	7
Total, No. (%)	46 (41)	38 (34)	6 (5)	2 (2)	2 (2)	2 (2)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	9 (8)	111 (100)

Abbreviations: *ACL*, anterior cruciate ligament; *CO*, *Corynebacterium*; *EA*, *Enterobacter aerogenes*; *EC*, *Enterobacter cloacae*; *EF*, *Enterococcus faecalis*; *Mu*, multiple; *PA*, *Propionibacterium acnes*; *PS*, *Pseudomonas*; *SA*, *Staphylococcus aureus*; *SE*, *Staphylococcus epidermidis*; *SH*, *Staphylococcus haemolyticus*; *SM*, *Staphylococcus hominis*; *ST*, *Streptococcus*; *SW*, *Staphylococcus warneri*.

Resultat

Functional Outcome and Graft Retention in Patients With Septic Arthritis After Anterior Cruciate Ligament Reconstruction: A Systematic Review

Eric C. Makhni, M.D., M.B.A., Michael E. Steinhaus, B.A., Nima Mehran, M.D.,
Brian S. Schulz, M.D., and Christopher S. Ahmad, M.D.

19 studies, 203 infected knees

- Mean FU: 44.2 months
- Mean Lysholm: 82
- Mean IKDC: 68
- 67% return to pre-injury level of activities
- 22% evidence of new degenerative changes
- Mean flexion and extension deficit of 5.8°

Sports-specific differences in postsurgical infections after arthroscopically assisted anterior cruciate ligament reconstruction

**Werner Krutsch¹ · Johannes Zellner¹ · Florian Zeman² · Michael Nerlich¹ ·
Matthias Koch¹ · Christian Pfeifer¹ · Peter Angele^{1,3}**

Sports	Total number ACLR <i>n</i>	Timing primary ACLR Mean/SD	Infection cases <i>n</i> (%)
Football	1130	42.7 d/±25.6	11 (1.0%)
Skiing	557	44.5 d/±26.5	0 (0.0%)
Cycling	59	52.1 d/±29.8	2 (3.4%)
Tennis	32	42.6 d/±15.1	2 (6.3%)
Team handball	18	41.4 d/±15.4	1 (5.6%)
Basketball	13	42.4 d/±19.5	1 (7.7%)
Total	1809	43.5 d/±23.2	17 (0.9%)

Epaule

0,26% de sepsis

(n= 530754 patients)

facteur risque ? : infiltration,
revision

Risk Factors for Infection After Shoulder Arthroscopy in a Large Medicare Population

Cancienne JM et al, Am J Sports Med. 2018

Conclusion

- Risque inférieur à 1%
- Infiltration, tabac ...
- Sport de contact
- Arthroscopie lavage
- Antibiothérapie adaptée