Correlation between 6-month return-to sport test results after ACLR and clinical and functionnal outcome. A 4-year follow-up of 498 patients

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DISCLOSURES

Not for this study

Consultant

Stryker
SBM
FH

After ACLR ?

- Return to sport
  - 80% return to sport
  - 2/3 return to pre-injury level
  - ½ return to competitive sport

- And
  - Re-rupture *6% to 25%…*
  - Contralateral rupture *5% to 24%…*
  - Secondary meniscal lesions

Time after surgery?
Graft ?
Rehabilitation ?
Etc…

NOT ENOUGH

Andrade BJSM 2020
Desai, KSSTA 2017
Mohan, Arthroscopy 2018

And so…?

PREDICTIVE ELEMENTS TO ANTICIPATE THESE COMPLICATIONS IN THE MEDIUM AND LONG TERM

EVALUATION AFTER ACLR SHOULD BE MULTIFACTORIAL

Turk Arthroscopy 2023
Keays KSSTA 2019
Webster AJSM 2018

How ?

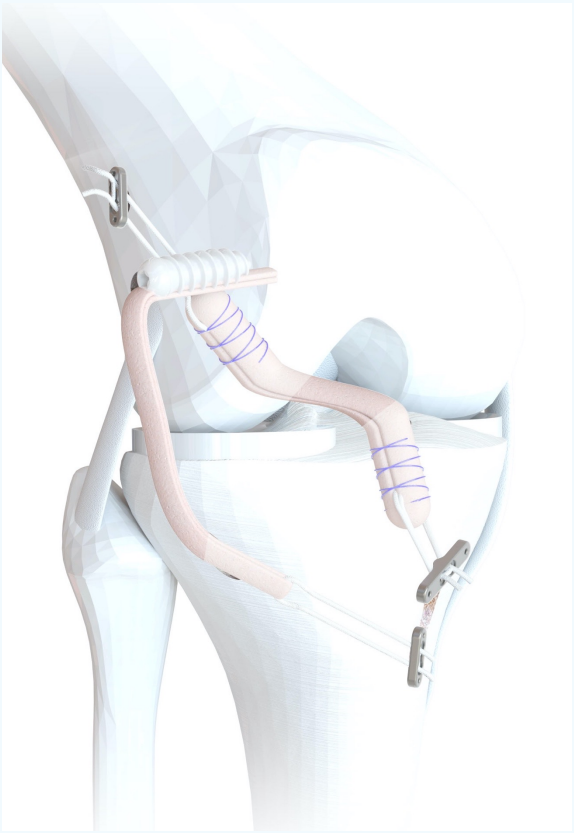
- Development of composite tests = To evaluate ability for RTS

- Several parameters :
  - Jump tests
  - Strength evaluation
  - Psychological evaluation with ACL-RSI

➡ Correlation between parameters of the test and clinical / functionnal results at medium FU ?

Thomée , Sports Injuries 2011
Blakeney Sports Health 2018
Rivera-Brown, PM R 2022
Webster Phys Ther Sport 2008
Gokeler KSSTA 2017

Material and methods



- Monocentric study
- Primary ACLR
- **498** patients
- Same composite test at 6 months

- At the longest follow-up
  - *Reruptures , reoperations and contralateral ruptures*
  - *Subjective IKDC, Tegner, Self Knee Value SKV, ACL-RSI*

Material and methods

COMPOSITE TEST

- STRENGTH EVALUATION:
  - Quad conc 60°/s
  - Quad conc 240°/s
  - Hamstrings conc 60°/s
  - Hamstrings conc 240°/s
  - Hamstrings exc 30°/s
  - Ratios
- JUMP TESTS
  - Single Hop Test
  - Triple Hop Test
  - Side Hop Test
  - Drop Jump Test
  - Squat Unipodal
- ACL-RSI

AMPLITUDES ARTICULAIRES	COTÉ SAIN	COTÉ OPÉRÉ
FLEXION	140	140
EXTENSION	0	5° de flessum

TEST ISOCINETIQUE		COTÉ SAIN	COTÉ OPÉRÉ	DÉFICIT
QUADRICEPS	CONC 60°/sec	115	84	27%
	CONC 240°/sec	687	639	7%
ISCHIOJAMBIERS	CONC 60°/sec	72	72	0%
	CONC 240°/sec	767	746	3%
	EXC 30°/sec	103	83	20%

ANGLE PIC COUPLE IJ EXC 30°/SEC	NORME <15°	4	6

RATIOS IJ/Q	60°/sec (conc/conc)	240°/sec (conc/conc)	Mixte (IJexc30/Quadconc240)
NORME	0,5-0,6	0,7-0,8	>1,2
COTE SAIN	62	1,12	1,8
COTE OPERE	85	1,17	1,5

SAUTS	COTÉ SAIN	COTÉ OPÉRÉ	DÉFICIT
SINGLE HOP TEST	180	175	3%
TRIPLE HOP TEST	555	530	5%
SIDE HOP TEST (MAX SAUTS EN 30 SEC)	62	66	-6%
DROP JUMP TEST (RAS 0 / VALGUS 1)	0	1	
SQUAT UNIPODAL (RAS 0 / VALGUS 1)	1	1	

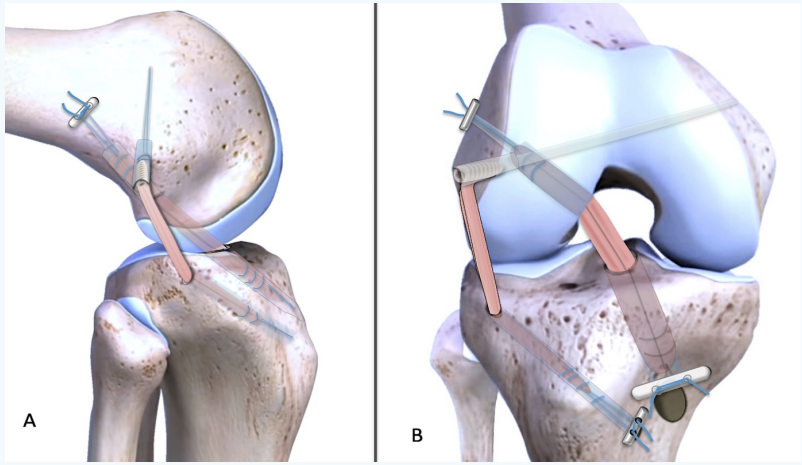
SCORE ACL-RSI	88%

TEST FAVORABLE À UNE REPRISE DES ACTIVITÉS DE PIVOTS SANS CONTACT SOUS AVIS CHIRURGICAL SI : FLEXION > 120° / EXTENSION < -5° ET DEFICIT MUSCULAIRE ET AUX TESTS DE SAUTS < 15%

CONCLUSION :
Déficit en force du quadriceps.
Déficit des IJ en excentrique.
Les ratios sont un peu trop élevés en force pour le côté opéré et en endurance pour le coté sain et le côté opéré. Ceci témoigne de la nécessité de renforcer le quadriceps vis-à-vis des IJ.
Les tests de sauts sont bons mais la lutte contre le valgus dynamique reste à travailler.
Test favorable sous réserve de poursuivre le renforcement et le contrôle moteur.

RESULTS

- FU : 4,8 years ± 1
- Mean age : 27,6 ans ± 11
- Preoperative Tegner : **7,1 ± 1**



- Re-ruptures: **5,4%** *(27 patients)*
- Contralateral ruptures : **10,6%** *(53 patients)*
- Reoperations : **11,8%** *(59 patients)*

RESULTS – RTS ?

- RTS = 91 %

  ACL RSI better if RTS (65 vs 58) p< 0,022

- Return to the same sport = 72 %

  ACL RSI better if return to same sport 68 vs 56 p< 0,001

- Return to the same sport same level = 59 %

  ACL RSI if same level 69 vs 59 p< 0,001

Ardern CL, AJSM 2011
Andriolo L. KSSTA 2015

RESULTS – FUNCTIONNAL RESULTS ?

- Postoperative Tegner = **6** ± 2,1 *(↘ 1 point…)*
- Postoperative IKDC = **77** ± 11,9
- SKV = **87%** ± 14
- 6 months ACL RSI <u>correlated</u> with IKDC/Tegner/SKV at 5 y FU

  p<0,001

RESULTS

NO CORRELATION BETWEEN ELEMENTS OF THE COMPOSITE TEST AND:

- RERUPTURE
- CONTRALATERAL RUPTURES
- REOPERATIONS

$p > 0,1$

Results

- ACL RSI **6 months** = **65 %** ± 39
- ACL RSI **5 years** = **69 %** ± 26

$p < 0{,}001$

But in 4 years, only 4 points…

✓ STATISTICAL CORRELATION between ACL-RSI at 6 m and 5 y

DISCUSSION

No correlation between elements of the composite test and rerupture, contralateral ruptures and reoperations

So composite test at 6 months after ACLR :

To correct deficits with an objective analysis

To know who will return to sport and how

BUT IS NOT PREDICTIVE FOR FAILURES

DISCUSSION

Small increase (but statistical) of ACL-RSI

65 → 69

Patients with low ACL-RSI at 6 months

… stayed low at 5-years FU

DISCUSSION

Correlation between ACL-RSI at 6 months and 5 years

And ACL-RSI at 6 months correlated with resumption to jumps and proprioception

Lee DW, Knee 2018
Peebles AT, Med Sci Sports Exerc. 2021
Legnani C, J. Clin Med 2023

VERY IMPORTANT TO INTRODUCE JUMPS

FROM THE REHABILITATION PHASE *(3 to 6 months)*

CONCLUSION

- Composite tests = Only for evaluation of RTS

- Still need to develop *predictive* tools for clinical elements

  … as reruptures/contralateral ruptures remain issues

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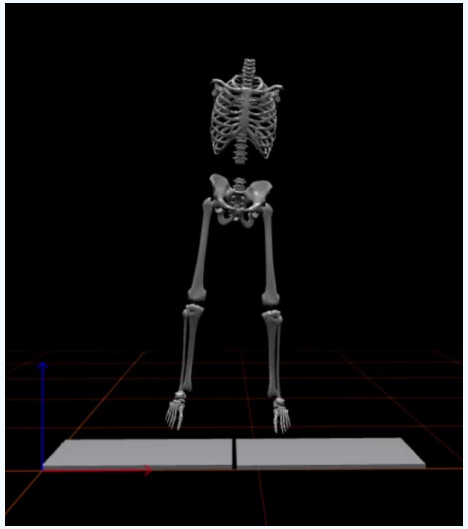
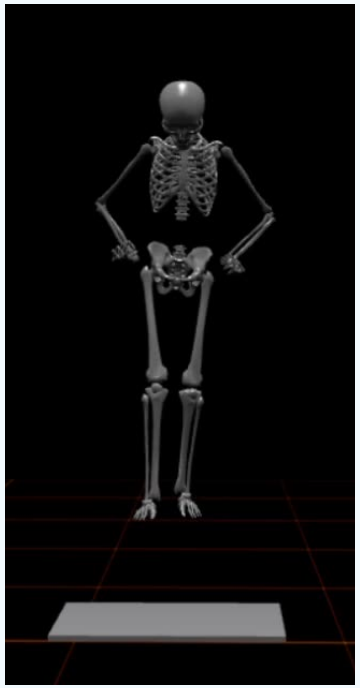
More analysis of the mouvement ?





CONCLUSION

- ACL-RSI at 6 months = Correlation with functionnal scores at 5 Y

…but little evolution between 6m and 5y

- Patients really have to resume jumps during rehab
  - Under control
  - Progressively