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Changing the ACL reconstruction algorithm from

“Transtibial & autologous hamstring”

to

“Anteromedial portal & autologous BPTB”

leads to improved knee laxity at 5-to-10 years follow-up, but maintaining activity levels remains a greater challenge

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Disclosures:

All authors on this study declare that they DO NOT have any financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in relation to the study

ACL reconstruction is one of the most popular sports medicine surgeries

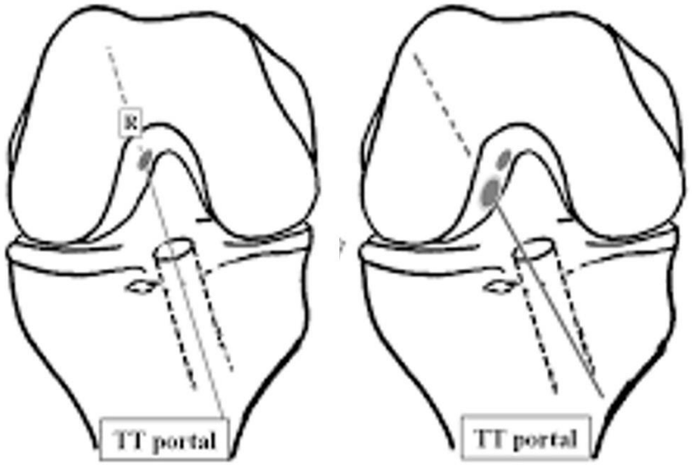
Failure of this surgery may have a devastating impact on the ability of young athletes to pursue their career goals and may promote early arthritic changes in the knee

Therefore,

There is ongoing research aimed to improve surgical techniques and rehabilitation protocols in order to decrease failure rates of this surgery

During the last decade, two of the most common debated subjects in this respect were ***"graft choice"*** *and* ***"tunnel preparation technique"***

ACL reconstruction for young active population in our sports service:



Quadruple strand hamstring autograft

2004 - 2010

In <u>2011</u>: a different paradigm was introduced

Bone-patellar tendon-bone autograft

2011 – 2017

and until today…

The purpose of this study was to compare clinical outcomes and failure rates between the two surgical paradigms

We implemented strict inclusion criteria:

1. Isolated autologous ACLR (no concomitant ligament reconstructions)

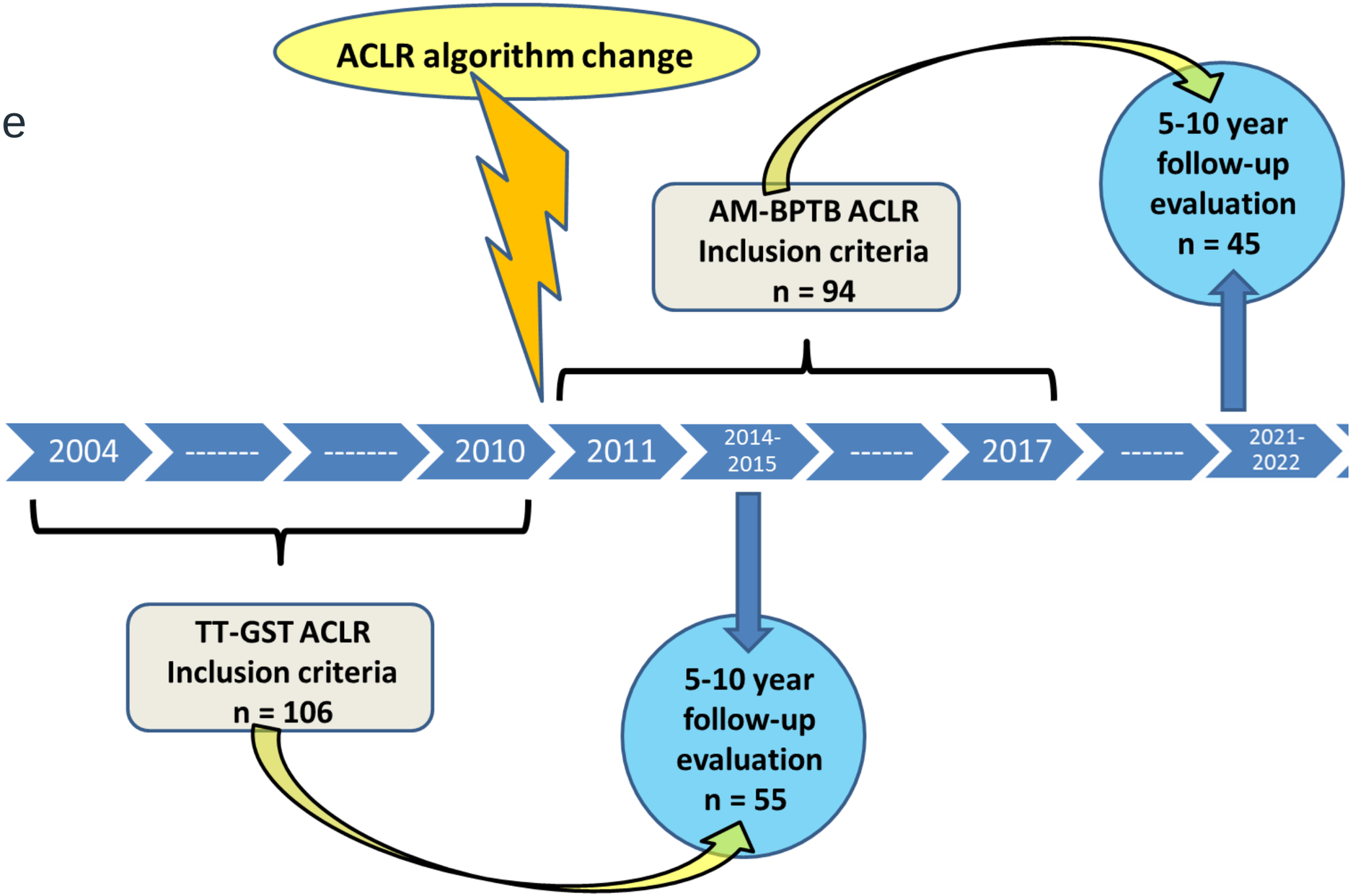
2. Only sports-related ACL tear (no high-energy cases such as MVA, fall from height, etc.)

3. Only men

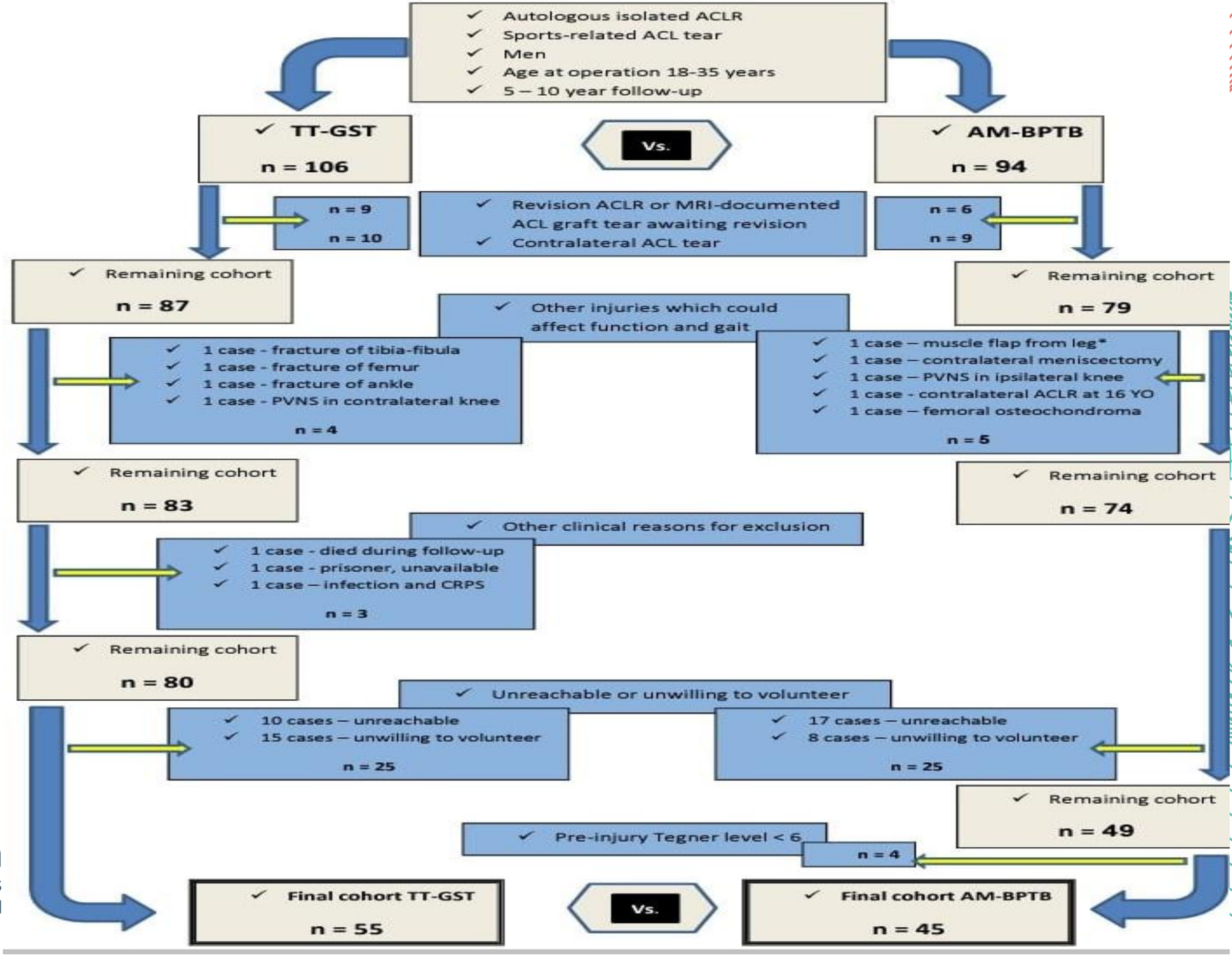
4. Age at operation 18-35 years (“best ACLR candidates”, *AAOS* evidence-based guideline, *JBJS Am* 2015)

5. Study follow-up examination performed at between 5 and 10 year postoperatively

Study time-line



Cohort flow-chart



Population and injury demographics

Variable	TT HMS	AM BPTB	*p* value
Age at operation [mean] (range)	25.3 (18-35)	25 (18-35)	ns
Follow-up, years [mean] (range)	7.1 (5-10)	7.2 (5-10)	ns
Tegner level at preinjury [median] (range)	7 (6-10)	7 (6-10)	ns
Marx score at preinjury [median] (range)	12 (8-16)	12 (4-16)	ns
BMI [mean ± SD]	24.2 ± 2	25.7 ± 3	ns
Interval injury-surgery, months [mean ± SD]	13 ± 20	10 ± 14	ns
Isolated ACL tear (no meniscal and chondral lesions)	34%	27%	ns
Follow-up rate (final cohort / all eligible patients)	55/80 = 68%	45/71 = 63%	ns
Smokers [n.]	15/55 = 27%	13/45 = 29%	ns

Comparable populations & injuries

Graft failures and surgical complications

Variable	TT HMS	AM BPTB	*p* value
Documented revision ACLR cases + MRI-documented graft ruptures **(These cases were not included in the final cohort)**	9/106= **8.5%**	6/94= **6.4%**	---
Pivot shift grade = 2-3	19/55= **34%**	2/45= **4%**	**< 0.01**
KT sides difference ≥ 5-mm	11/55= **20%**	4/45= **9%**	**< 0.01**
"Minor" surgical interventions during follow-up: Cyclops removal [n.] Meniscectomies [n.] Adhesiolysis [n.] Isolated removal of painful hardware (metal screws, staples) [n.]	9/55= **16%** 1 5 0 3	7/45= **15%** 2 2 1 2	ns
Joint infections (this was excluding factor from final cohort) [n.]	1	0	---
Persistent lack of knee extension [n.] Terminal knee flexion lacking ≥ 10° [n.]	1 5	0 1	---

Ligament laxity and function assessment at follow-up

Variable	TT HMS	AM BPTB	*p* value
KT sides difference [mean ± SD]	2.8 ± 2.3	1.4 ± 1.9	**< 0.01**
Tegner level; Marx score [median] (range)	7 (2-10); 4 (0-16)	7 (3-10); 6 (0-16)	ns; ns
Tegner level decrease [mean ± SD] (from preinjury to follow-up)	2.1 ± 2.1	1.2 ± 1.5	**0.01**
Marx score decrease [mean ± SD] (from preinjury to follow-up)	7.2 ± 5.1	4.6 ± 4.8	**0.01**
IKDC-subjective [mean ± SD]	82 ± 13	88 ± 10	**< 0.01**
KOOS – sports [mean ± SD]	74 ± 20	77 ± 16	ns
KOOS – ADL [mean ± SD]	94 ± 9	95 ± 7	ns
KOOS – QOL [mean ± SD]	58 ± 24	62 ± 22	ns

Take-home message

ACLR techniques are evolving, aiming to restore native knee mechanics

World-wide evidence-based knowledge helps us today suggesting young active athletes the best "offer" for accomplishing their sports career goals

The current study shows that applying the independent drilling technique and using patellar tendon autograft results in a better restoration of knee mechanics in young athletes compared to using transtibial technique and hamstring tendon autograft

Long-term maintenance of highly active lifestyle remains however a greater challenge

[1] Shea KG, et al. The American Academy of Orthopaedic Surgeons evidence-based guideline on management of anterior cruciate ligament injuries. *J Bone Joint Surg Am* 2015;97:672-674.

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[3] Raharadja R, et al. No difference in revision rates between anteromedial portal and transtibial drilling of the femoral graft tunnel in primary anterior cruciate ligament reconstruction: early results from the New Zealand ACL Registry. *Knee Surg Sports Traumatol Arthrosc* 2020;28:3631-3638.