



7TH Advanced Course on Knee Surgery
14th to 18th January 2018
Val d'Isère – France

Surgery: Steps of reconstruction

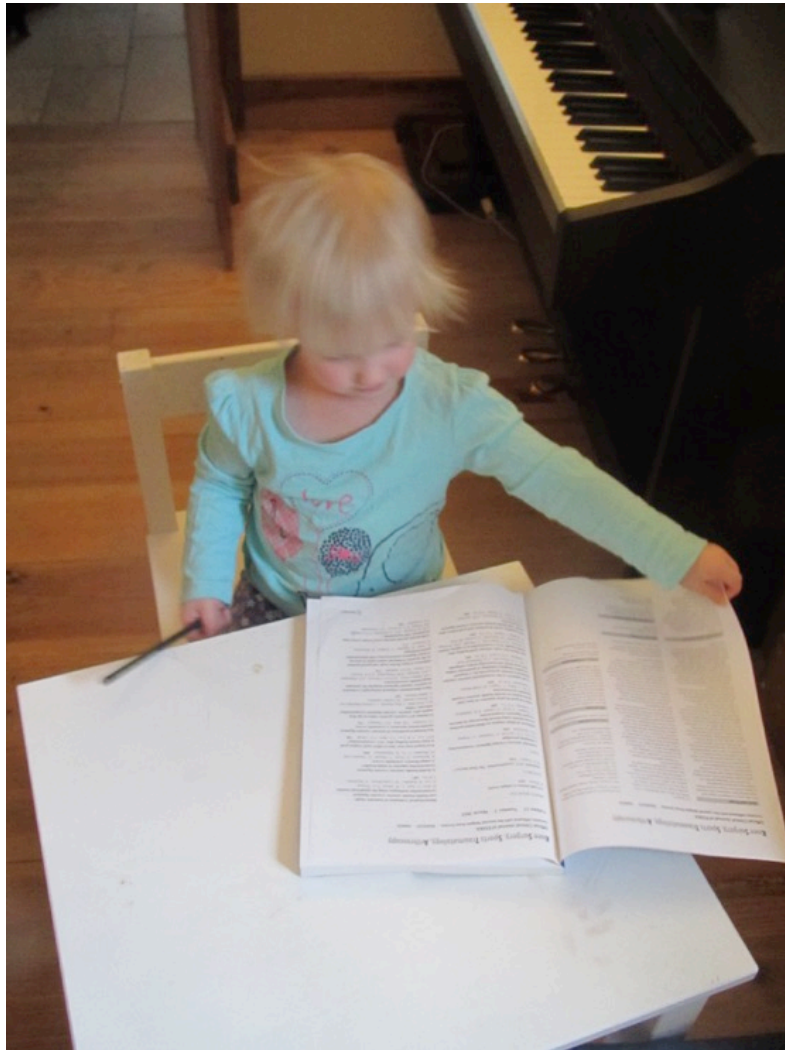
Mike Carmont

Princess Royal Hospital

Shropshire, UK



Literature search



Research encouragement



18th ESSKA Congress

9 – 12 May 2018



Glasgow, Scotland, UK

www.esska-congress.org



ESSKA President
Romain Seil (Luxembourg)

Congress President
Jón Karlsson (Sweden)

Scientific Chairman
Gino M. Kerkhoffs (The Netherlands)
Fares S. Haddad (UK)
Michael T. Hirschmann (Switzerland))

Organiser & Contact
Intercongress GmbH
esska@intercongress.de



Surgery: make a plan



Multiple-Ligament Knee Injuries: A Systematic Review of the Timing of Operative Intervention and Postoperative Rehabilitation

By William R. Mook, MD, Mark D. Miller, MD, David R. Diduch, MD, Jay Hertel, PhD, ATC,
Yaw Boachie-Adjei, MD, and Joseph M. Hart, PhD, ATC

TABLE II Outcomes for Each Surgical Timing Group

Timing	N	Anterior Instability	Posterior Instability	Varus Laxity	Valgus Laxity	Average Range of Motion	Flexion Loss $\geq 10^\circ$
Acute	244						
Percentage (95% confidence interval)*		17.4 (12.8 to 23.3)†	15.3 (11.0 to 21.0)	6.7 (3.8 to 11.5)	8.5 (5.1 to 13.7)	124.5°	1.4 (25.1 to 38.0)‡
No. of patients		35 of 201	31 of 202	11 of 165	14 of 165	147	58 of 185
Chronic	106						
Percentage (95% confidence interval)*		7.5 (3.9 to 14.2)	13.2 (8.0 to 21.0)	5.4 (2.3 to 12.1)	4.3 (1.7 to 10.7)	130.5°	8.1 (2.8 to 21.3)
No. of patients		8 of 106	14 of 106	5 of 92	4 of 92	8	3 of 37
Staged	46						
Percentage (95% confidence interval)*		10.9 (4.7 to 23.0)	9.1 (3.1 to 23.6)	3.0 (0.5 to 14.3)	0.0 (0.0 to 10.4)	129.4°	0.0 (0.0 to 17.6)
No. of patients		5 of 46	3 of 33	1 of 33	0 of 33	46	0 of 18

Acute treatment resulted in less residual knee instability compared chronic treatment
OR 2.58 95% CI 1.2 to 5.8, p=0.018

Acute treatment results in more flexion deficits compared to chronic treatment
OR 5.18 95% CI 1.5-17.5, p=0.004

Staged is a combination of both repair and reconstruction in the acute or chronic phase

The Multiple-Ligament Injured Knee: Evaluation, Treatment, and Results

Gregory C. Fanelli, M.D., Daniel R. Orcutt, M.D., M.S., and Craig J. Edson, M.S., P.T., A.T.C.

TABLE 1. *Surgical Timing Algorithm for Acute ACL/PCL Injuries*

ACL/PCL lateral-side injuries

Surgery within 2-3 weeks after injury

Arthroscopic ACL/PCL reconstruction plus lateral side reconstruction (type A and B PLRI)

Lateral-posterolateral augmented primary repair

Stage type C lateral-side injuries

Lateral-posterolateral augmented primary repair (within first 10 days)

Arthroscopic ACL/PCL reconstruction (4–6 weeks later)

ACL/PCL medial-side injuries

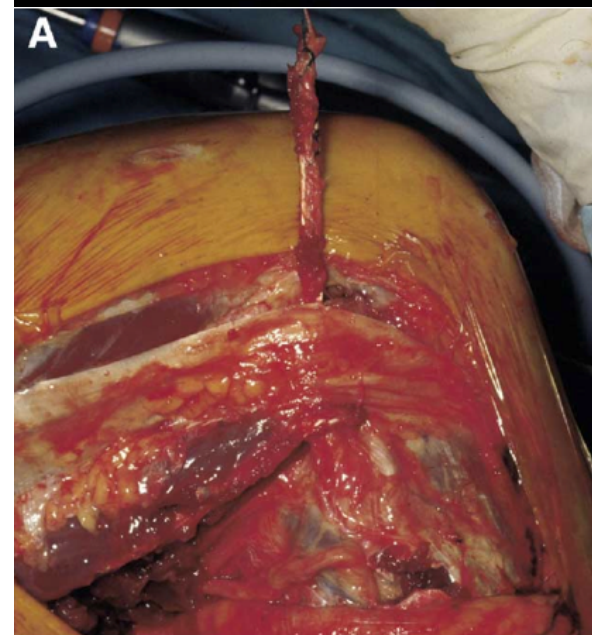
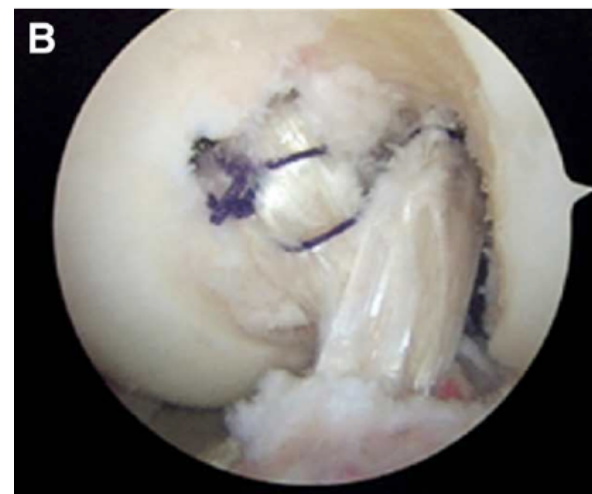
Surgical timing depends on degree of medial-side damage

Low-grade MCL injury: brace treatment 4–6 weeks followed by arthroscopic ACL-PCL reconstruction

High-grade MCL injury

MCL augmented primary repair (within first 10 days)

Arthroscopic ACL/PCL reconstruction (4–6 weeks later)



The Multiple-Ligament Injured Knee: Evaluation, Treatment, and Results

Gregory C. Fanelli, M.D., Daniel R. Orcutt, M.D., M.S., and Craig J. Edson, M.S., P.T., A.T.C.

- 2-10 year outcome
- 35 ACL/ACL
 - Lateral 19
 - Medial 6
- Post-operative
 - Lysholm 91.2
 - Tegner 5.3
 - HSS 86.8
- Significantly improved
- Arthroscopic ACL & PCL together with collateral

Current Concepts in Knee Dislocations: PCL, ACL, and Medial Sided Injuries

James P. Stannard, MD¹ Kathryn L. Bauer, MD¹

- Current concepts
- 3-4 weeks acute phase
- PCL, MCL & PMC
- 6 weeks rehabilitation
- ACL
- n=113, 2 year follow up
- Failure rate
 - Repair 20%
 - Reconstruction 4%

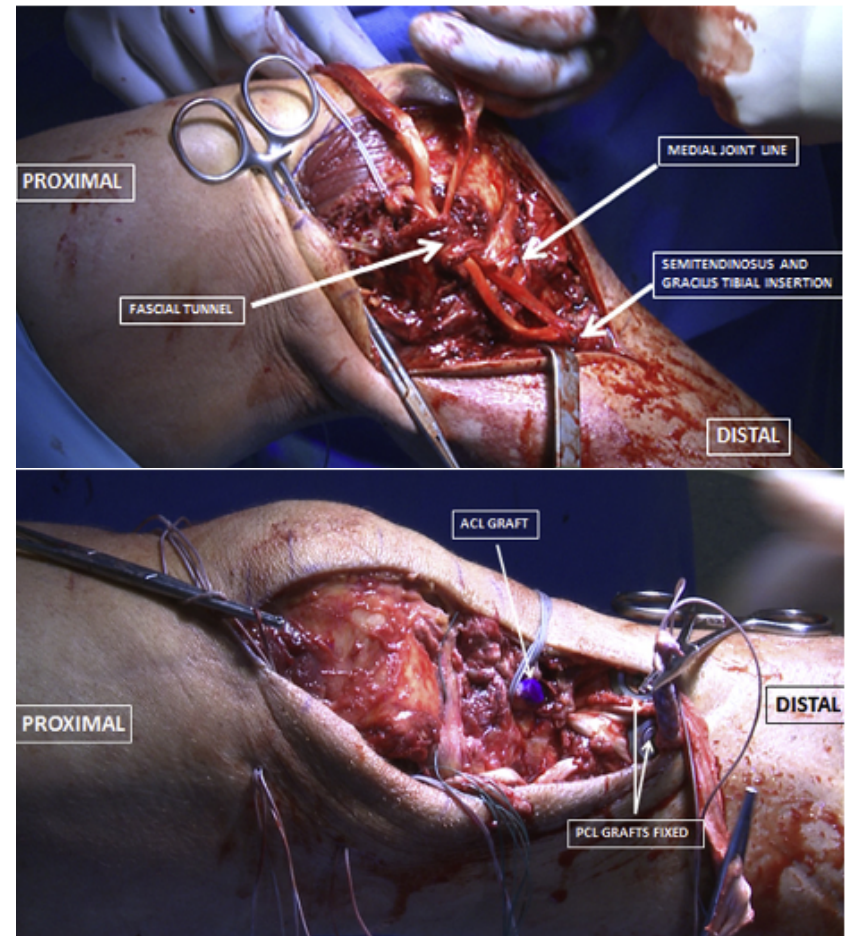
p=0.042



Multiligament Reconstruction of the Knee in the Setting of Knee Dislocation With a Medial-Sided Injury

Marcio B. Ferrari, M.D., Jorge Chahla, M.D., Justin J. Mitchell, M.D., Gilbert Moatshe, M.D., Jacob D. Mikula, B.S., Daniel Cole Marchetti, B.A., and Robert F. LaPrade, M.D., Ph.D.

- Acute phase 2-3 weeks One stage
- MCL prepared
- ACL tunnels
- PCL tunnels
- PCL graft
- ACL graft
- Tensioning and fixation MCL
- No outcome data



Stay awake!



Results of Multi-Ligament Injured Knees Operated by 3 different strategies Sun et al 2016

- Cohort series 2001-2011
- n=32
 - 1st Stage, n=12, repair & recon all ligaments
 - 2nd Stages, n=11, repair & recon all extra-articular ligaments then intra-articular
 - 3rd group those just extra-articular alone

Group (total number)	Involved structure	No	Surgical methods
One-stage (12)	ACL/PCL/PMC	7	PMC repair, ACL/PCL reconstruction
	ACL/PCL/PLC	2	PLC reattachment, ACL/PCL reconstruction
	ACL/PCL/PLC	3	ACL/PCL/PLC reconstruction
Staged (11)	ACL/PCL/PMC	5	First stage: PMC repair Second stage: ACL/PCL reconstruction
	ACL/PCL/PMC	1	First stage: PMC repair Second stage: ACL reconstruction
	ACL/PCL/PLC	2	First stage: PLC reattachment Second stage: ACL/PCL reconstruction
	ACL/PCL/PLC	2	First stage: PLC reconstruction Second stage: ACL/PCL reconstruction
	ACL/PCL/PLC	1	First stage: PLC reconstruction Second stage: PCL reconstruction
	ACL/PCL/PLC	1	First stage: PLC reconstruction Second stage: PCL reconstruction
EA repair (9)	ACL/PCL/PMC	7	PMC repair
	ACL/PCL/PLC	2	PLC reattachment

ACL=Anterior cruciate ligament, PCL=Posterior cruciate ligament, PLC=Posterolateral complex, PMC=Posteromedial complex, EA repair=Extraarticular repair

Results of Multi-Ligament Injured Knees Operated by 3 different strategies Sun et al 2016

- Follow up 34.7 ±12.1 months
- Differences Lysholm p=0.043 1 stage & extra-articular alone
- No difference groups 1 & 2.
- Not randomized
- Culture

	One-stage	Staged	EA repair		
Age (years)	31.5±14.4	29.5±7.8	45.3±12.6	5.038	0.013
I-S interval (days)	13.0±5.1	10.4±2.8	10.7±3.3	1.516	0.236
Preoperative					
Lysholm scores	1.5±2.7	1.1±2.4	1.3±2.6	0.071	0.931
Followup (months)	34.0±11.6	36.9±12.8	33.0±13.0	0.279	0.756
At final followup					
ROM (°)	138.3±17.0	140.0±13.4	144.4±10.1	0.497	0.613
Lysholm scores	91.1±7.0	86.3±6.1	84.7±7.1	2.661	0.087

EA repair=Extraarticular repair, I-S interval=Interval from the injuries to the primary surgery, SD=Standard deviation, ROM=Range of motion

Subscale	Mean±SD			F	P
	One-stage	Staged	EA repair		
Pain	94.7±7.8	96.5±4.5	92.8±6.9	0.772	0.471
Activities of daily living	90.8±5.7	86.5±6.3	87.7±7.3	1.342	0.277
Sports	89.3±7.3	84.2±6.6	78.9±6.2	6.083	0.006
Knee symptoms	89.1±7.6	85.7±5.2	80.4±6.2	4.673	0.017
Quality of life	88.0±6.3	85.5±6.9	82.1±7.6	1.877	0.171

KOOS=Knee Injury and Osteoarthritis Outcome Score, SD=Standard deviation, EA repair=Extraarticular repair

Practice Guidelines for the management of multi-ligamentous injuries of the knee.

Goyal et al. Indian J Orthop 2017

- Systematic Review
- 521 articles, 38 papers
- Looking at:
 - Early vs. delayed
 - Repair with treatment
 - Operative vs. non-operative

Study	Year	Design	
Wascher <i>et al.</i> ⁴⁸	1999	Prospective cohort	
Bernstein ⁵⁰	2011	Systematic review	
Dwyer <i>et al.</i> ⁴⁹	2012	Review article	
Meuffels <i>et al.</i> ⁵¹	2012	Systematic review	
Burrus <i>et al.</i> ⁵	2016	Systematic review	
Study	Year	Design	Level of evidence
Mariani <i>et al.</i> ⁵³	1999	Retrospective cohort	III
Stannard <i>et al.</i> ⁵²	2005	Prospective cohort	II
Levy <i>et al.</i> ⁵⁵	2010	Prospective cohort	III
Peskun <i>et al.</i> ¹⁵	2010	Meta-analysis	I
Black and Stannard <i>et al.</i> ⁵⁶	2015	Review article	I
Dwyer <i>et al.</i> ⁴⁹	2012	Review article	II

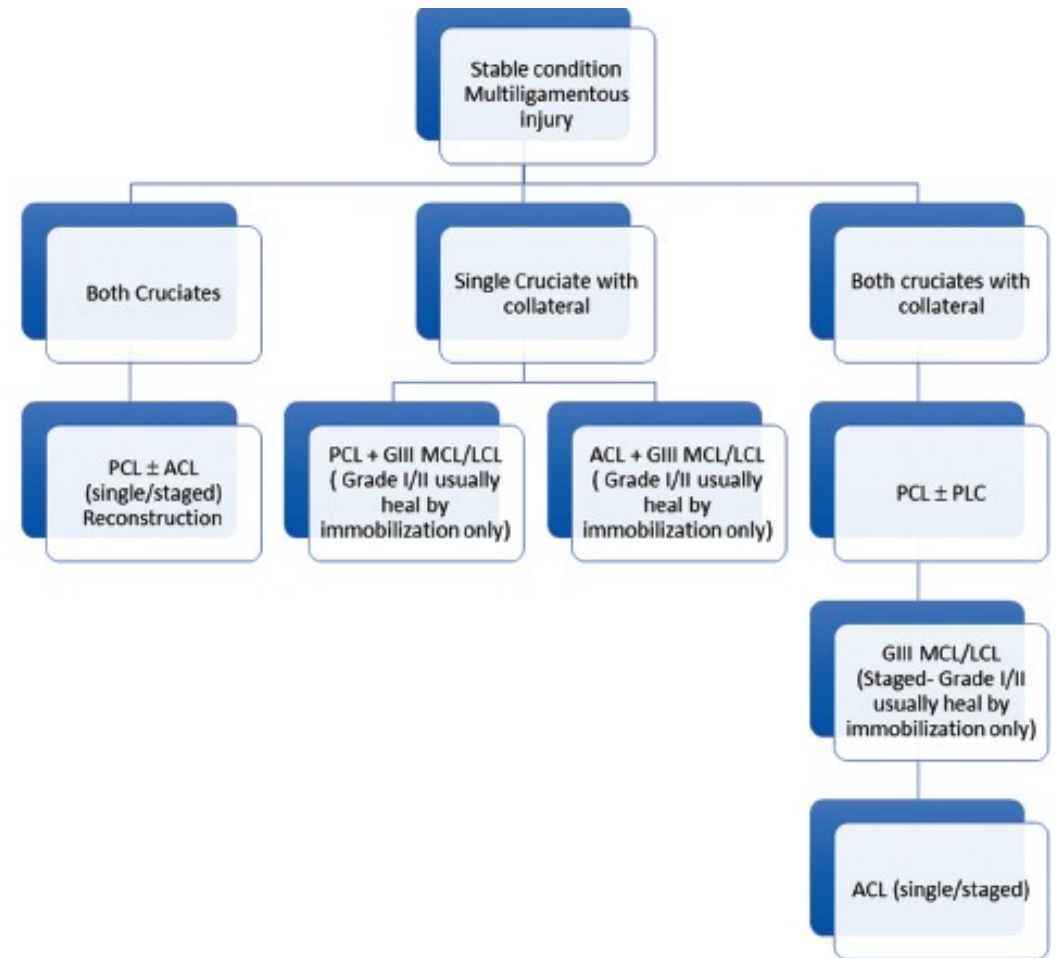
Authors	Lysholm score	Tegner scale	IKDC	ROM	RTE	RTS
Richter ¹⁰	64.8	2.7	NR	NR	53%	17%
Ríos <i>et al.</i> ³²	NA	NR	NR	NR	NR	NR
Wong <i>et al.</i> ³³	NR	NR	63.7	136.8	NR	NR
Dedmond and Almekinders ³⁴	82.5	NR	NR	123	Same as conservative	Same as conservative

ROM=Range of motion, IKDC=International Knee Documentation Committee, RTS=Return to sport, RTE=Return to employment, NA=Not available. NR=Not Reported.

Practice Guidelines for the management of multi-ligamentous injuries of the knee.

Goyal et al. Indian J Orthop 2017

- Conclusions
- Inclination towards early staged/single procedure
- MCL better results with non-operative and recon other injuries



Clinical outcomes after multiligament injured knees: medial versus lateral reconstructions

N. Tardy¹ · P. Boisrenoult¹ · P. Teissier¹ · C. Steltzlen¹ · P. Beaufiles¹ · N. Pujol¹

- Cohort comparison study 2003-2011 n=39
- PMC vs. PLC MLK Injury
- Follow up 57 (12-129) months
- No difference acute sub-groups
- PLC outcome better acute than chronic
- Acute PLC recon

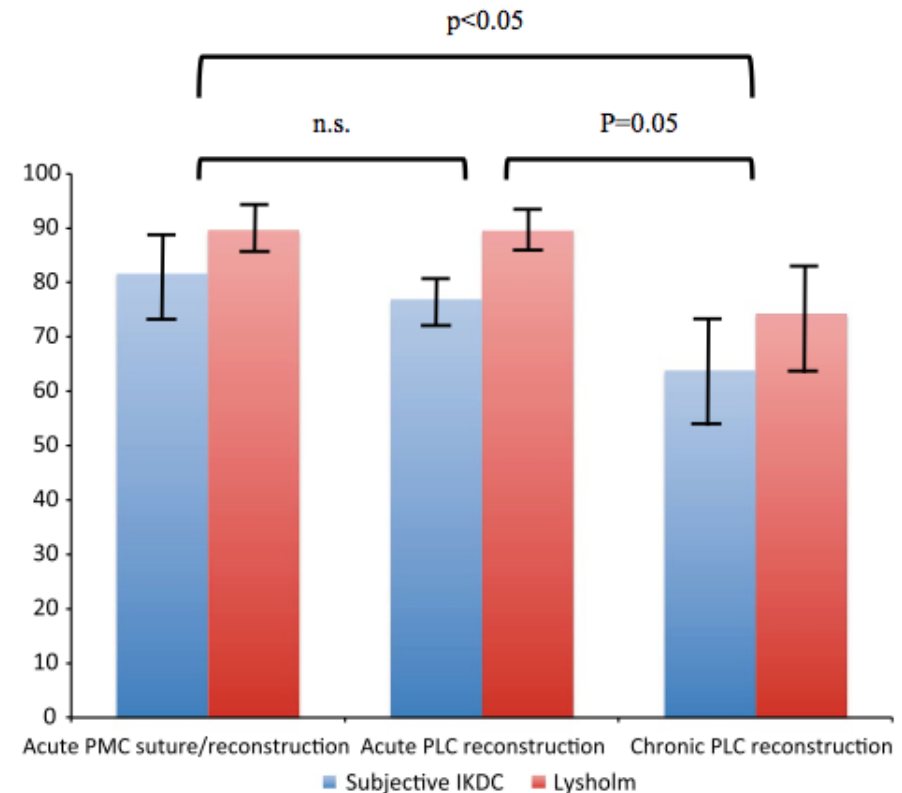


Table 5 Clinical outcomes graded as 'excellent'/'good' and 'fair'/'poor' according to subjective IKDC and Lysholm scores

	Acute PMC repairs/reconstructions (%)	Acute PLC reconstructions (%)	Chronic PLC reconstructions (%)
Excellent/good results	79	72	44
Fair/poor results	21	28	56

Take home message

- Lacking evidence firm guidelines
- Staged procedure
 - PCL, PLC and Medial side
 - Delayed ACL reconstruction
- Numbers involved multi-centre collaboration
- PRISMA Compliant Systematic Review of overlapping meta-analyses

18th ESSKA Congress

9 – 12 May 2018



Glasgow, Scotland, UK

www.esska-congress.org



ESSKA President
Romain Seil (Luxembourg)

Congress President
Jón Karlsson (Sweden)

Scientific Chairman
Gino M. Kerkhoffs (The Netherlands)
Fares S. Haddad (UK)
Michael T. Hirschmann (Switzerland))

Organiser & Contact
Intercongress GmbH
esska@intercongress.de



Venez en Ecosse sa magie!

RAB C
NESBITT

