APPENDIX

MODEL SELECTION PROCESS AND SENSITIVITY ANALYSES

Final decision: The optimal four-group model (1 3 3 2) was selected because (1) it had the highest (best) BIC values, (2) the fourth trajectory was considered clinically relevant, (3) it had good model-fit parameters, and (4) the two sensitivity analyses did not substantially change the model and it was therefore considered robust.

First model selection stage: We changed the number of trajectories and repeated the analyses until we found the trajectory number with the highest (least negative) Bayesian information criterion (BIC) value: a higher BIC value indicates better model fit as it balances improvements in model likelihood with the number of parameters estimated. All trajectories were quadratic at this stage. The BIC values increased with every increase in number of trajectories up to four (Table 1). **Decision: Proceed to identify the optimal four-group model.**

Table 1. BIC for IKDC-SKF group-based trajectory modeling according to number of trajectories.

Number of trajectories[3]	BIC[1] (n=276)	BIC[2] (n=1408)
1	-5284	-5288
2	-5210	-5216
3	-5182	-5192
4	-5167	-5180
5	-5167	-5183

[1]BIC = Bayesian information criterion (for the total number of participants)
[2]BIC = Bayesian information criterion (for the total number of observations)

Second model selection stage: We changed the shapes for one trajectory at a time: we used a linear before a zero-shape if the quadratic component of the model was not statistically significant, otherwise we changed to a cubic shape to assess whether the BIC value increased. To be considered, shape components had to be statistically significant. The size and shape of each trajectory should not change substantially in this process. Finally, we chose the model with the highest BIC value (Table 2.1), while we also evaluated group size (optimally, >5% of the cohort should belong to the smallest trajectory).

The smallest trajectory, *High before declining*, of the optimal four-group model (1 3 3 2) (Table 2.1 and Figure 1.1) contained only 2.5% (n=7) of the cohort. It was, however, considered to be clinically relevant. **Decision: Proceed to calculate model-fit parameters for the optimal four-group model (1 3 3 2).**

Table 2.1 BIC for IKDC-SKF group-based trajectory modelling according to trajectory shapes – a four-group model

Trajectory shapes[1]	BIC[2] (n=276)	BIC[3] (n=1411)
1 2 2 2	-5165	-5177
1 3 2 2	-5133	-5146
1 3 3 2	**-5123**	**-5137**

[1]Trajectory shapes; 0 = zero-order; 1 = linear; 2 = quadratic; 3= cubic
[2]BIC = Bayesian information criterion (for the total number of participants)
[3]BIC = Bayesian information criterion (for the total number of observation)

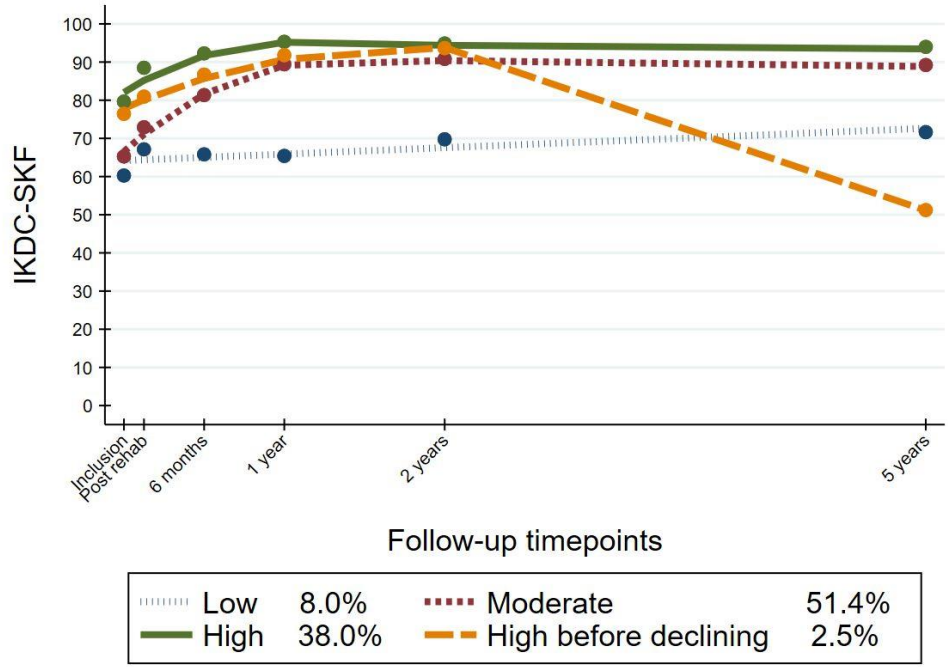

Figure 1.1 The optimal four-group model (1 3 3 2) identified in table 2.1

Model-fit parameters for the optimal four-group model (1 3 3 2) (Table 3.1). The mean posterior probability for each trajectory should be > 0.7 (scale from 0-1, where 1 indicates the smallest probability that the individuals could belong to a different trajectory than they were assigned to). The odds of correct classification should be >5 for each trajectory, and the estimated group probability and the percentage assigned should correspond. **Decision: The optimal four-group model (1 3 3 2) had good model-fit parameters. Proceed to perform two sensitivity analyses to assess the model's robustness.**

Table 3.1 Model-fit of the optimal four-group model (1 3 3 2)

Trajectory	Mean posterior probability	Odds of correct classification	Percentage assigned	Estimated group probability	n
Low	0.95	222.0	8.0	8.9	22
Moderate	0.87	6.4	51.4	50.2	142
High	0.86	9.8	38.0	37.5	105
High before declining	0.98	2064.1	2.5	3.4	7

Sensitivity analysis 1 (excluding patients with only 1 datapoint for IKDC-SKF, n=5) identified the same model (1 3 3 2) and was almost identical to the original model. The BIC values were slightly higher (-5104/-5118 vs -5123/-5137), but the model-fit parameters did not significantly change.

Sensitivity analysis 2 (using months since inclusion as the time variable and including all follow-up timepoints - both as non-surgically and surgically treated - for the patients who underwent delayed ACLR) were moderately different from the original analysis: The polynomials of the optimal model were slightly different (1 3 3 3 instead of 1 3 3 2), the BIC values was slightly lower (-5255/-5270 vs -5123/-5137), and the trajectory sizes changed moderately (Figure 1.2). The model-fit parameters were

above the recommended thresholds. **Decision: The two sensitivity analyses did not substantially change the model and the model was considered robust enough.**

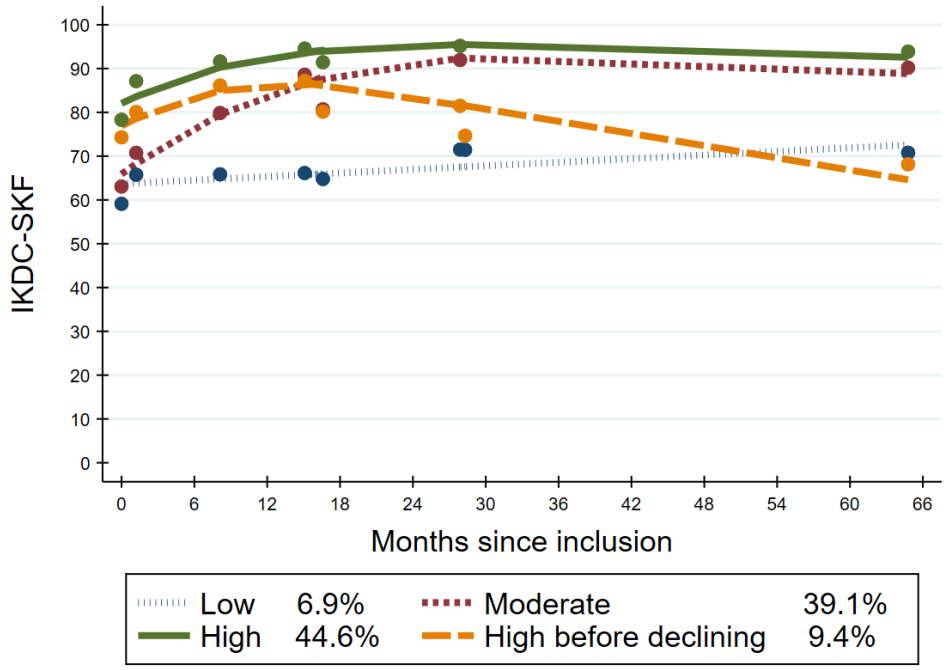

Figure 1.2 The optimal four-group model (1 3 3 3) identified in sensitivity analysis 2

2000 IKDC SUBJECTIVE KNEE EVALUATION FORM

SYMPTOMS*:

*Grade symptoms at the highest activity level at which you think you could function without significant symptoms, even if you are not actually performing activities at this level.

1. What is the highest level of activity that you can perform without significant knee pain?

   4❑Very strenuous activities like jumping or pivoting as in basketball or soccer
   3❑Strenuous activities like heavy physical work, skiing or tennis
   2❑Moderate activities like moderate physical work, running or jogging
   1❑Light activities like walking, housework or yard work
   0❑Unable to perform any of the above activities due to knee pain

2. During the past 4 weeks, or since your injury, how often have you had pain?

	10	9	8	7	6	5	4	3	2	1	0	
Never	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	Constant

3. If you have pain, how severe is it?

	10	9	8	7	6	5	4	3	2	1	0	
No pain	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	Worst pain imaginable

4. During the past 4 weeks, or since your injury, how stiff or swollen was your knee?

   4❑Not at all
   3❑Mildly
   2❑Moderately
   1❑Very
   0❑Extremely

5. What is the highest level of activity you can perform without significant swelling in your knee?

   4❑Very strenuous activities like jumping or pivoting as in basketball or soccer
   3❑Strenuous activities like heavy physical work, skiing or tennis
   2❑Moderate activities like moderate physical work, running or jogging
   1❑Light activities like walking, housework, or yard work
   0❑Unable to perform any of the above activities due to knee swelling

6. During the past 4 weeks, or since your injury, did your knee lock or catch?

   0❑Yes 1❑No

7. What is the highest level of activity you can perform without significant giving way in your knee?
   4❑Very strenuous activities like jumping or pivoting as in basketball or soccer
   3❑Strenuous activities like heavy physical work, skiing or tennis
   2❑Moderate activities like moderate physical work, running or jogging
   1❑Light activities like walking, housework or yard work
   0❑Unable to perform any of the above activities due to giving way of the knee

SPORTS ACTIVITIES:

8. What is the highest level of activity you can participate in on a regular basis?

4❑Very strenuous activities like jumping or pivoting as in basketball or soccer
3❑Strenuous activities like heavy physical work, skiing or tennis
2❑Moderate activities like moderate physical work, running or jogging
1❑Light activities like walking, housework or yard work
0❑Unable to perform any of the above activities due to knee

9. How does your knee affect your ability to:

		Not difficult at all	Minimally difficult	Moderately Difficult	Extremely difficult	Unable to do
a.	Go up stairs	4❑	3❑	2❑	1❑	0❑
b.	Go down stairs	4❑	3❑	2❑	1❑	0❑
c.	Kneel on the front of your knee	4❑	3❑	2❑	1❑	0❑
d.	Squat	4❑	3❑	2❑	1❑	0❑
e.	Sit with your knee bent	4❑	3❑	2❑	1❑	0❑
f.	Rise from a chair	4❑	3❑	2❑	1❑	0❑
g.	Run straight ahead	4❑	3❑	2❑	1❑	0❑
h.	Jump and land on your involved leg	4❑	3❑	2❑	1❑	0❑
i.	Stop and start quickly	4❑	3❑	2❑	1❑	0❑

FUNCTION:

10. How would you rate the function of your knee on a scale of 0 to 10 with 10 being normal, excellent function and 0 being the inability to perform any of your usual daily activities which may include sports?

FUNCTION PRIOR TO YOUR KNEE INJURY:

Couldn't perform daily activities	0 ❑	1 ❑	2 ❑	3 ❑	4 ❑	5 ❑	6 ❑	7 ❑	8 ❑	9 ❑	10 ❑	No limitation in daily activities

CURRENT FUNCTION OF YOUR KNEE:

Cannot perform daily activities	0 ❑	1 ❑	2 ❑	3 ❑	4 ❑	5 ❑	6 ❑	7 ❑	8 ❑	9 ❑	10 ❑	No limitation in daily activities