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ACL injuries – treatment and patients'  
experiences of outpatient surgery at UNN  
2008-2010

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# 1. ABSTRACT

Background: Since 2003 anterior cruciate ligament reconstructions has been done as outpatient surgery at the University Hospital of North Norway, UNN. Previously, the surgeries required overnight hospital stay. In 2010 a survey was done to see the experiences of the patients to whom ACL reconstruction was done 2004-2007.

Thesis aims: This master thesis will focus on the patients that underwent surgery during 2008-2010, to see if the routines at UNN have improved over the past few years. Important topics are to see how many was discharged the same day, find out patients' experiences of outpatient surgery and see how many that had to go through a new ACL reconstruction.

Materials and methods: In spring 2012 questionnaires were sent out to 98 patients that were enrolled in this study. 48 patients answered. A big part of this thesis is also literature study. Material was found by conducting a search in PubMed to find existing and relevant literature and newest research. Subsequent information was found from web sites and textbooks.

Results: 89,6% was discharged the same day. Those that were not discharged the same day reported that they had had their surgery late in the afternoon. 87,3% would go through the same surgery again. 93,7% of the patients was satisfied with outpatient surgery. 71% did not get any complications post-operatively. No thrombosis was registered. No one had to go through a new ACL reconstruction. Patients with high Tegnér score before injury have not the same possibility to continue at the same activity level after surgery as those with low Tegnér score before injury ( $p < 0,01$ ). Patients over 30 years of age showed better improvement in stability than patients less than 30 years of age ( $p < 0,05$ ).

Conclusions: The patients were generally pleased with outpatient surgery and leaving the same day. Most would undergo the same surgery again and showed good results when it comes to pain, stability and function.

## 2. NORSK SAMMENDRAG

Bakgrunn: En av de mest vanlige og dessverre veldig alvorlige kneskadene er skader på fremre korsbånd. I år 2003 begynte UNN med dagkirurgiske operasjoner av korsbånd. Før dette krevdes det innleggelse på sykehus. Slik systemet er organisert i dag, kommer pasienten inn samme dag som operasjonen skal skje og reiser også hjem samme dag. År 2010 ble en undersøkelse gjort der man ville se på erfaringene hos pasienter som ble operert dagkirurgisk for ACL rekonstruksjon i tidsrommet 2004-2007.

Material og metode: Våren 2012 ble et spørreskjema sendt ut til 98 pasienter som ble inkludert i denne studien. 48 pasienter svarte. Hensikten med denne undersøkelsen er å se på forskjellene mellom pasientenes erfaringer 2008-2010 og 2004-2007 for å se på forbedringer i rutiner på UNN. En del av denne oppgaven er også en litteraturstudie. Ved å gjøre søkning i Pub Med fant en relevante artikler. Faglitteratur har også blitt brukt.

Resultater: 89,6% av pasientene ble utskrevet fra sykehuset samme dag. De som ikke ble det hadde blitt operert sent på ettermiddagen. 87,3% kunne tenke seg å gå igjennom samme operasjon igjen nå når det vet hvordan utfallet ville blitt. 93,7% var fornøyde med å bli behandlet dagkirurgisk. 71% fikk ingen komplikasjoner post-operativt. Ingen venetrombose ble registrert. Det var ingen revisjon av korsbånd. Pasienter med høy Tegnér skår hadde det mer vanskelig å gjenoppta tidligere fysisk aktivitet enn de med lavere Tegnér skår ( $p<0,01$ ). Pasienter over 30 år viste større bedring i stabilitet enn pasienter under 30 år ( $p<0,05$ ).

Konklusjon: Pasientene var generelt sett meget fornøyd med å bli behandlet dagkirurgisk. Majoriteten viste en stor bedring når det kommer til smerte, stabilitet og funksjon.

### **3. INTRODUCTION**

In 2003, The University Hospital of North Norway, UNN, began to treat patients with anterior cruciate ligament injuries as outpatient surgery. Previously, the surgeries required overnight hospital stay. Improved technology, which makes the procedures shorter, is one of the main reasons that outpatient surgery nowadays is increasing. A shorter procedure causes fewer complications and allows patients to go home sooner. Outpatient surgery gives the hospital new challenges and in 2010 a survey was done to find out the experiences of the patients that had been treated surgically for ACL-injuries at UNN 2004 - 2007. (1)

This master thesis will focus not only on the ACL injury itself and the treatment possibilities but also on the patients that have been operated during 2008-2010, to see if the routines at UNN have improved over the past few years. Now there is more knowledge in outpatient ACL surgery, so therefore we expect to see even more satisfied patients and fewer patients converted to patients needing to stay in the hospital overnight.

This thesis will present an overview of the most common treatment procedures when the anterior cruciate ligament is damaged, both surgical and non-surgical treatment and what kind of patients that need surgery and what kind of patients than can be treated conservatively.

The questionnaires will provide a lot of understanding and tell what the patients think of their knees and the results of their surgeries. Are the knees better now, with less pain and better stability? Has the number of re-operated patients gone down? Would the patient go through a surgery again if necessary? Were they satisfied with the overall impression of outpatient surgery?

Interesting figures are also the ones that will tell the difference in patient satisfaction 2004 - 2007 vs. 2008 - 2010.

## **4. BACKGROUND**

### **4.1 The anatomy of the knee**

An important and weight-bearing joint in the human body is the knee joint. It is also the largest joint in the body. At first sight it may look simple, but it is very complex. It is made up of three bones; the femur, the tibia and the patella, which is a knee cap that is located in front of the knee. Fibula is located in the lower leg, but never really enters the knee joint. It is connected to tibia with a small joint.

Between the bones there is fibrocartilage that covers the ends of the femur and tibia; the medial and the lateral meniscus, which act as shock absorbers. (2) They distribute the body weight across the knee joint.

The knee is a synovial joint. The knee joint capsule surrounds the entire knee. Inside the capsule there is a specialized membrane, also known as the synovial membrane that produces synovial fluid and nourishes the surrounding structures. It also reduces friction at the joint.

To stabilize the knee and our movements the knee has ligaments. The collateral ligaments are found at the sides of the knee; the medial collateral ligament (MCL) and the lateral collateral ligament (LCL). These prevent the knee from moving too far in the side-to-side direction.

In the centre of the knee joint there are two cruciate ligaments; the anterior cruciate ligament (ACL) and the posterior cruciate ligament (PCL). They are important for the stability and control the front-to-back motion of the knee joint. (3) The ACL has its origin on the lateral femoral condyle and its insertion on the tibia plateau. The PCL connects the posterior intercondylar area of the tibia to the medial condyle of the femur.

For the knee to be able to function in a proper way, there are two important muscle groups surrounding the knee joint. They play a vital role both for stability and movement. Quadriceps is important in knee extension and hamstrings in knee flexion.

(4) The patellar tendon is part of the quadriceps mechanism

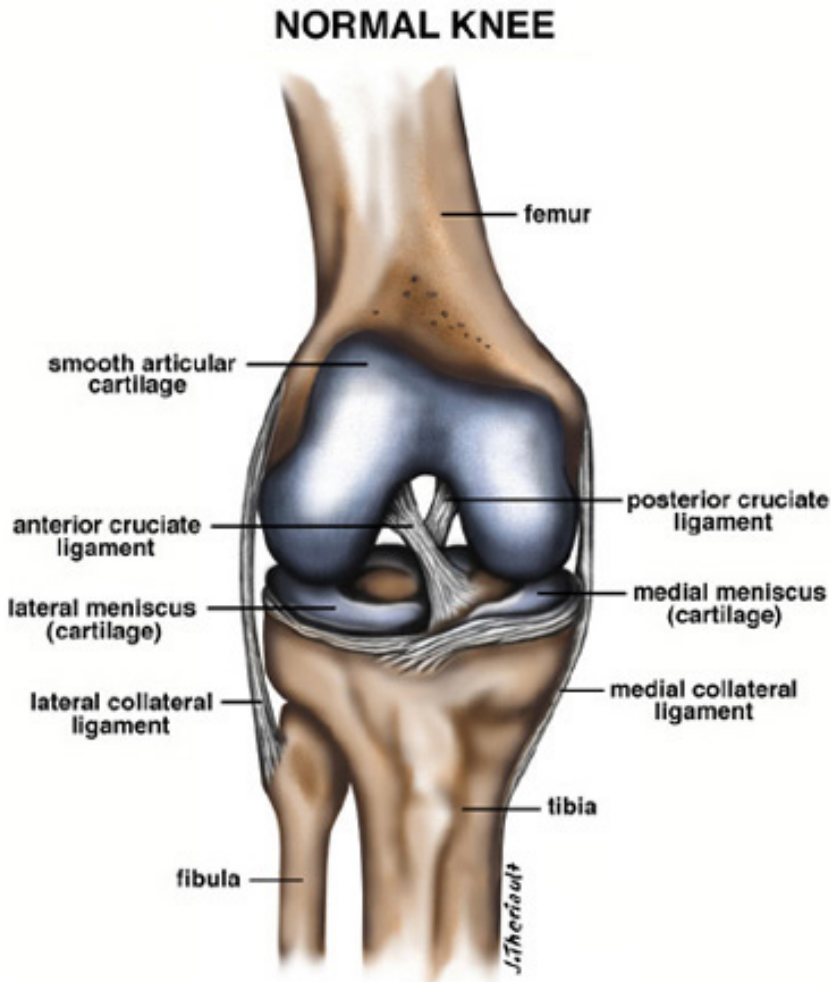


Figure 4.1.1: The normal anatomy of the right knee. Source: <http://www.oahct.com/>, Orthopaedic associates of Hartford

## 4.2 The ACL injury

An ACL injury is over-stretching or tearing of the ligament in the knee. It is the most serious and common knee injury. The stability of the knee is graded into I, II or III, according to the severity of the tear, which can be either a partial or a total rupture. The Lachman test is the best test to determine the stability of the knee and a possible ACL

tear. The patient is in supine position with the knee flexed to about 20-30 degrees. The examiner places one hand behind the proximal tibia and the other on the patient's thigh to stabilize the femur. Tibia is being pulled anteriorly on the femur. (5) An intact ACL should prevent the tibia from moving forward. The clinical testing may be difficult and therefore the best time to exam is before surgery during anaesthesia.

Injuries of the ACL rarely occur in isolation. About half of all ACL injuries occur in combination with damages to other structures of the knee such as collateral ligaments or menisci. (6)

### **4.3 Causes**

An ACL injury is often a sports-related injury. Though, no single cause accounts for this injury. It can also occur during falls, vehicle collisions or work and be due to contact or non-contact. In sports 80% of the ACL injuries are non-contact injuries. The damage to the ligament often occurs when the knee is straightened beyond its normal limits, hyperextended, twisted or bent side to side. A typical situation is when changing direction quickly with one foot solidly planted on the ground, landing after a jump or falling off a ladder. The patients can usually hear or feel a snap in their knee. The knee will usually swell in a couple of hours because of bleeding. (7) Handball, soccer and skiing are typical causes of ACL tears.

### **4.4 Epidemiology**

The incidence of ACL injuries is not really known, but it has been estimated to 32-70 injuries per 100 000 inhabitants per year. (8) According to a more recent cohort study from Sweden that was published in 2012, the incidence is 78 ACL injuries per 100 000 inhabitants per year. This study concluded that the average age for an ACL patient is 31 years and 60 % of the patients are men. 36 % of the patients underwent surgery. (9) In 2004-2005, three national registers for ligament reconstructions were established in



Scandinavia. The first registry was the Norwegian Cruciate Ligament Registry, which achieved status as a national medical quality registry in 2010. Norway has about 2000 ACL injuries a year. About 50 % of the patients will undergo ACL reconstruction. (10)

## **4.5 Treatment**

Treatment of an ACL injury can be either surgical or non-surgical. The decision will be made depending upon the individual needs and activity level of the patient. The young, active patient will most likely require surgery to be able to continue the active lifestyle, while an less active, older patient is pleased to return to a more quiet lifestyle without surgery. (11) It is however important to stop symptomatic instability.

### ***4.5.1 Non-surgical treatment***

Although the tear will not heal without surgery it is possible to treat the ACL-injury conservatively. This is a good option for elderly patients with a low level of activity as long as the stability of the knee is intact. For injuries like this physical therapy is a good alternative to strengthen the supporting leg muscles. The patient can also use a brace to support and protect the knee from instability. However, many of those treated conservatively might experience secondary injury to their knee due to repetitive instability episodes. In Norway, 50% of the ACL injuries are treated conservatively. (12)

### ***4.5.2 Surgical treatment***

Reconstruction is necessary when it comes to tears of the ACL, because they cannot be sutured back together. The blood supply is permanently damaged and the ligament cannot heal itself. Already in 1905 the first ACL reconstruction was performed using an iliotibial band. (13) Mostly autologous grafts are used, but allograft can also be

used. The choice of graft is individualised on the patient and the surgeon.

These days the bone-patellar tendon-bone is widely used and considered a good graft source. In this autograft, the middle third of the patellar tendon along with a bone plug from the shin of the kneecap is used. This is referred to as the "gold standard" for ACL reconstruction by some surgeons. (14) At UNN the bone-patellar tendon-bone is mostly used.

Using the semitendinosus and the gracilis tendon on the inner side of the knee creates hamstring tendon autograft. This graft does not have bone plugs and the function might therefore be limited. According to the Swedish National ACL Database, the hamstring tendon is used in over 90 % of the surgeries in Sweden. (15)

Studies comparing outcomes of hamstring and patellar tendon autograft has shown that graft failure is lower among those patients having patellar tendon autograft. However, these grafts are more likely to give postoperative patellofemoral pain. (16) Some studies show faster recovery and less postoperative stiffness problems with hamstrings graft. (17)

## 5. MATERIAL AND METHODS

For this retrospective study, 98 patients met the criteria and were enrolled. A total of 111 patients underwent surgery between January 1<sup>st</sup>, 2010 and December 31<sup>st</sup>, 2012 at UNN, but 13 of these patients were eliminated from the analysis because they had too complex injuries and it would have been impossible to focus on the results of ACL reconstruction only. Questionnaires were sent out in April 2012 to 98 patients that were had ACL reconstruction with surgery code NGE45 during this three-year period. The questionnaires were sent only once and the patients could respond anonymously.

Totally 48 patients sent back their questionnaire, which gives a respond on  $48/98= 48.9\%$ . 5 letters came back due to unknown recipient. The results from the questionnaires were compared with the results from a similar survey with patients that underwent surgery between 2004-2007 to see if UNN has improved its routines. Therefore, the survey focuses on both on results of the surgery and the impression overall.

First and foremost the patients were asked questions according to the Lysholm score. It is a well validated functional score with eight questions designed for knee ligament injuries. It gives a good picture on how the injury affects life quality. Patients can themselves analyse the following parameters: pain, limp, support, locking, swelling, instability, stair climbing and squatting before and after surgery of the ACL. (18) Minimum score is 0 and maximum score is 100. A score over 85 indicates a good result and knee function, while a low score is characteristic for those with daily problems. Part two focuses on postoperative complications. Part three gives us a picture of stability, pain and function before and after surgery. Part four are questions about the overall impression about outpatient surgery. In part five Tegnér score is used. It gives a picture of the patient's activity level before trauma and after reconstruction. The patients can score themselves and their activity level from 0 to 10 points, where 0 points means sick leave due to knee problems and 10 points means sports on national or international elite level. (19)

Finally, part six gives the patients possibility to comment on anything and they are being asked if they would go through the surgery again if they knew the outcome.

The questionnaire were quite similar to the one sent out in the previous study, although this one gave the patients possibility to comment on every question and explain more why they for example had a specific opinion.

When going through the questionnaires one could see that some patients gave several answers in part five, Tegnér score. The alternative with the highest score was used in this study. One patient did not answer part six, but is nevertheless included in the other data. Therefore only 47 patients were included in part six.

A big part of this thesis is also literature study. Material was found by conducting a search in PubMed to find existing and relevant literature and newest research.

Subsequent information was found from web sites and textbooks.

Case sheets from UNN were also used.

Data was analysed and displayed using Excel and SPSS.

## 6. RESULTS

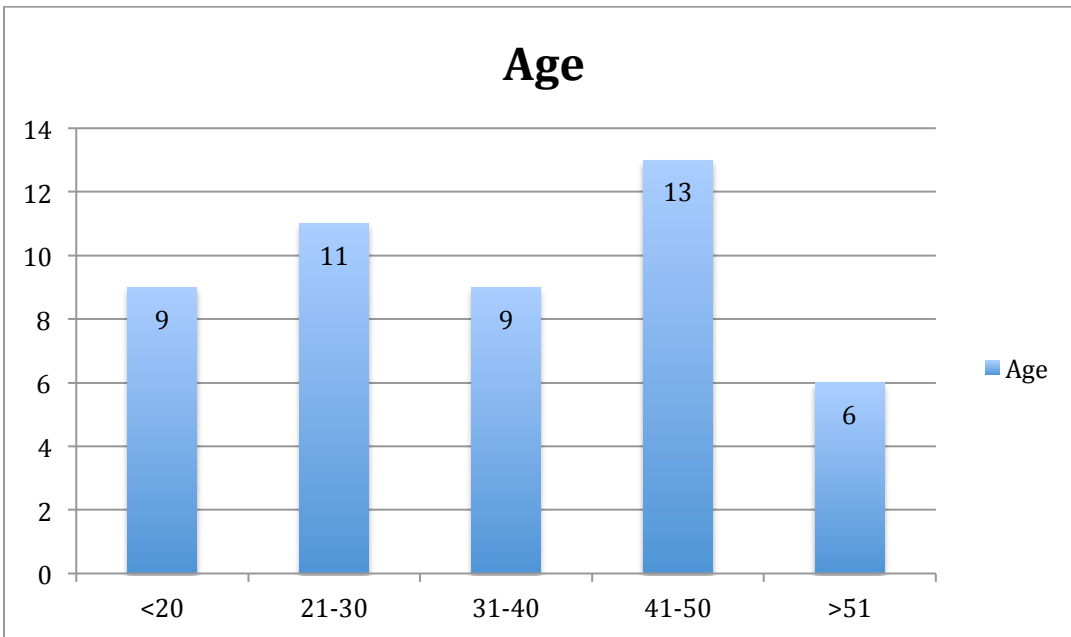


Figure 6.1. Age distribution at the time for registration of the questionnaires

Age	n	%
< 20	9	18,75
21-30	11	22,92
31-40	9	18,75
41-50	13	27,08
51+	6	12,50
<b>Total</b>	<b>48</b>	<b>100,00</b>

Table 6.2. Age distribution at the time for registration of the questionnaires

Gender	n	%
Woman	24	50,0
Man	24	50,0
<b>Total</b>	<b>48</b>	<b>100,0</b>

Table 6.3 Gender distribution

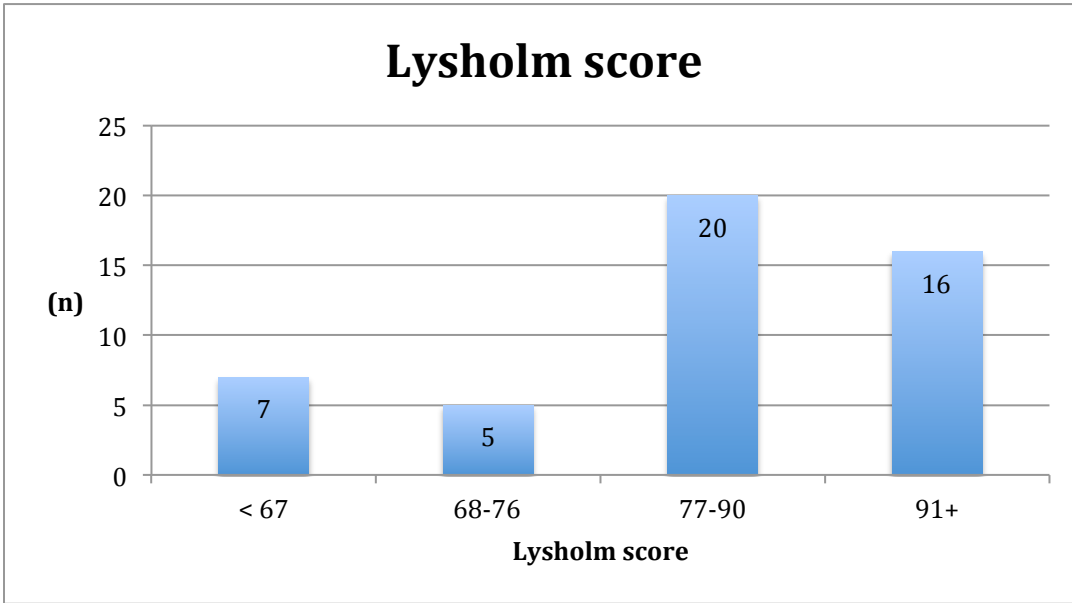


Figure 6.4 Lysholm score among the patients minimum one year after reconstruction. (100 to 91 points excellent, 90 to 77 good, 76 to 68 fair, less than 68 poor.)

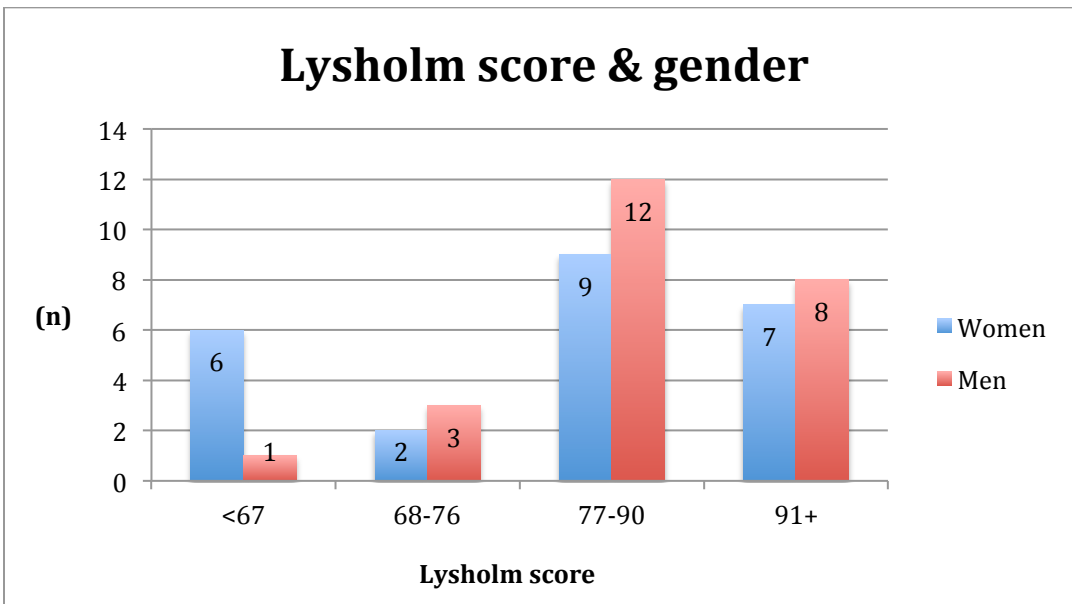


Figure 6.5 Distribution of Lysholm score and gender

Lysholm	N	Minimum	Maximum	Mean	SD
Women	4	26	100	76,37	
Men	24	16	100	84,04	
Mean	48	16	100	80,21	

Table 6.6 Lysholm score for 24 women and 24 men, totally 48 knees.

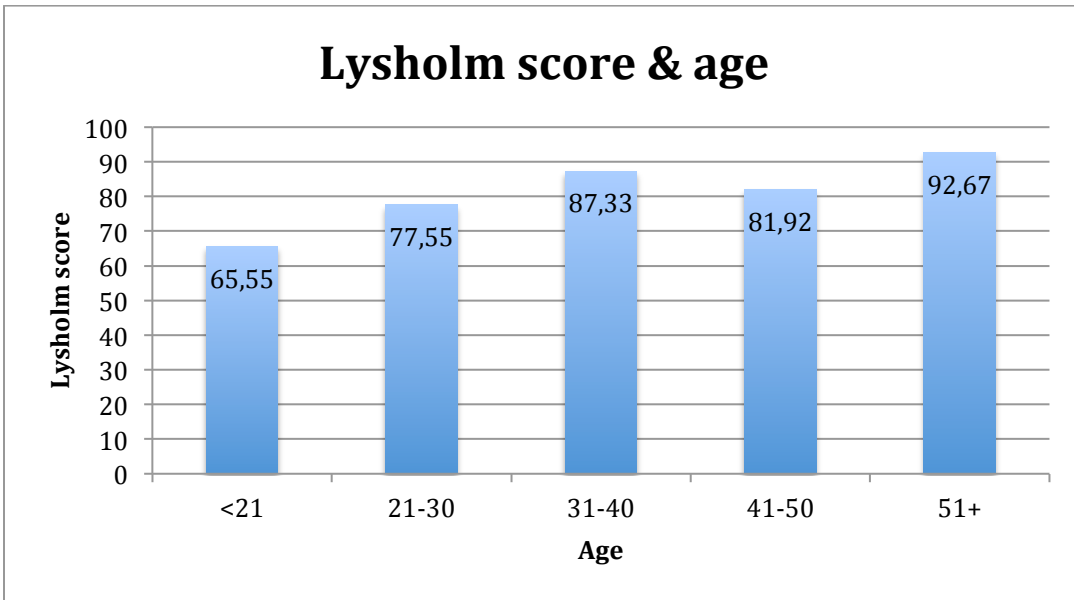


Figure 6.7 Mean Lysholm score according to age group

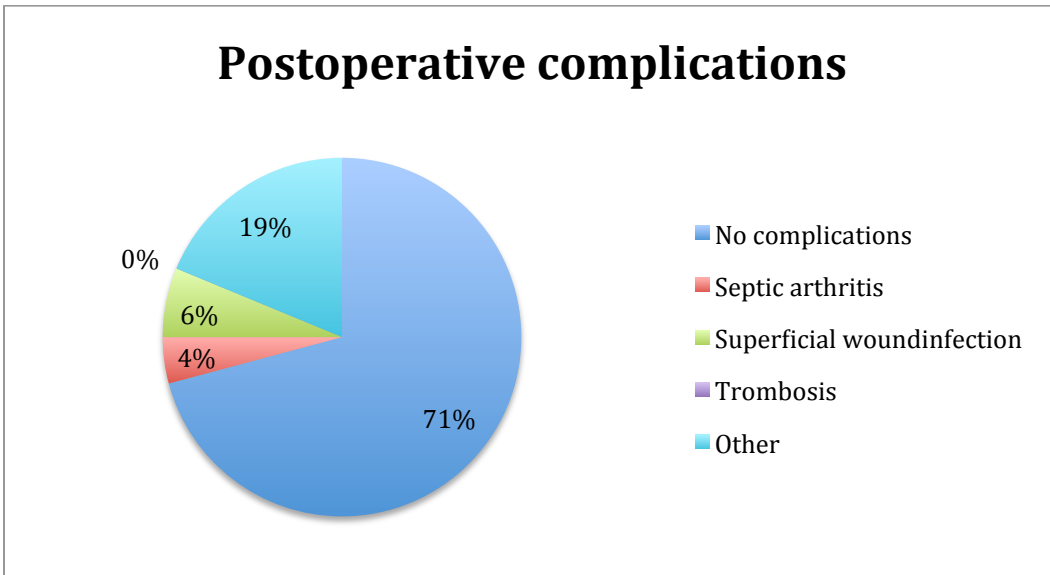


Figure 6.8 Complications after surgery

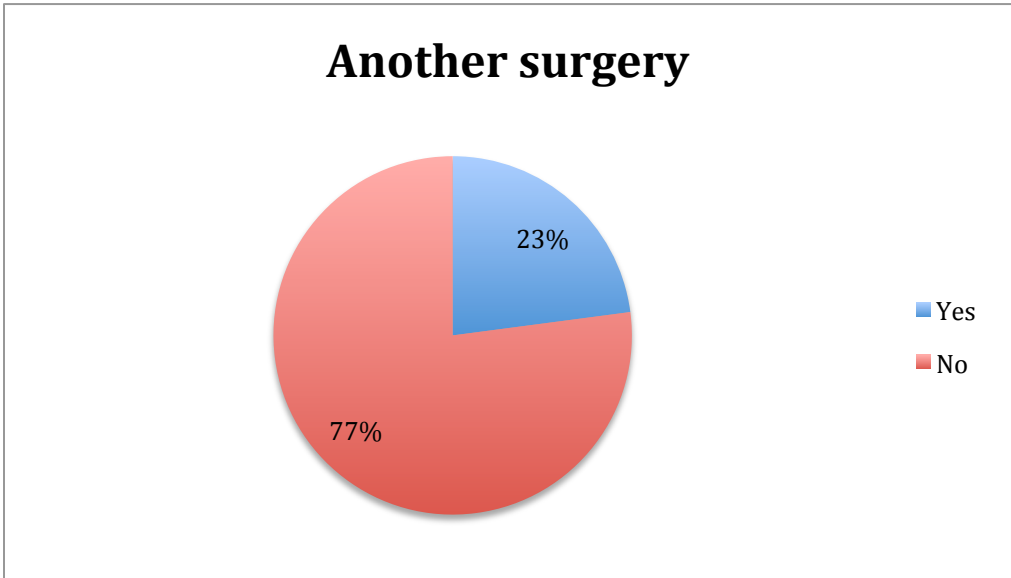


Figure 6.9 Did you have to go through another surgery?

New surgery	n	%
Yes	11	23,0
No	37	77,0
<b>Total</b>	<b>48</b>	<b>100,0</b>

Table 6.10 Number of re-operated

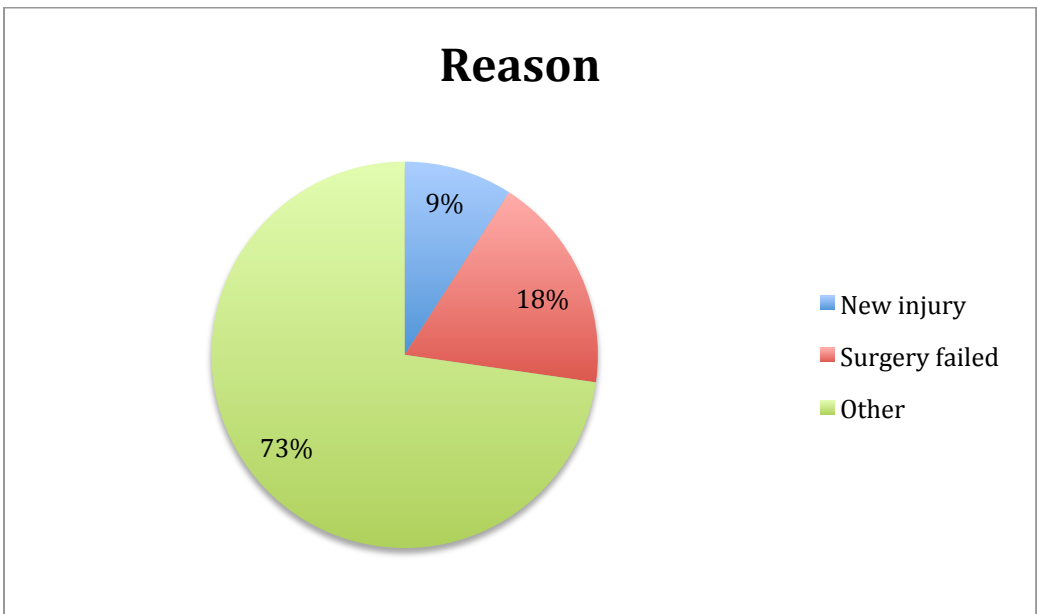


Figure 6.10 Reason for another surgery



## PRE/POST OP

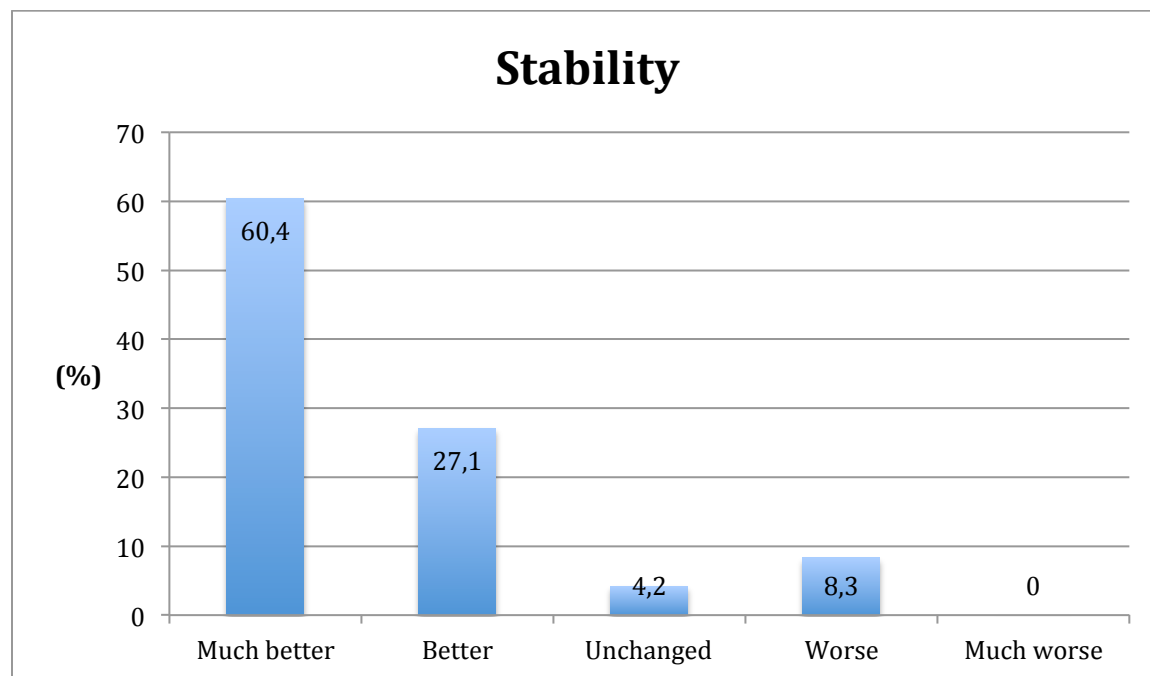


Figure 6.11 The patients' view on the stability of the knee after surgery vs. before

### Stability

	n	%
<b>Much better</b>	29	60,4
<b>Better</b>	13	27,1
<b>Unchanged</b>	2	4,2
<b>Worse</b>	4	8,3
<b>Much worse</b>	0	0,0
<b>Total</b>	<b>48</b>	<b>100,0</b>

Table 6.11.1 The patients' view on the stability of the knee after surgery vs. before

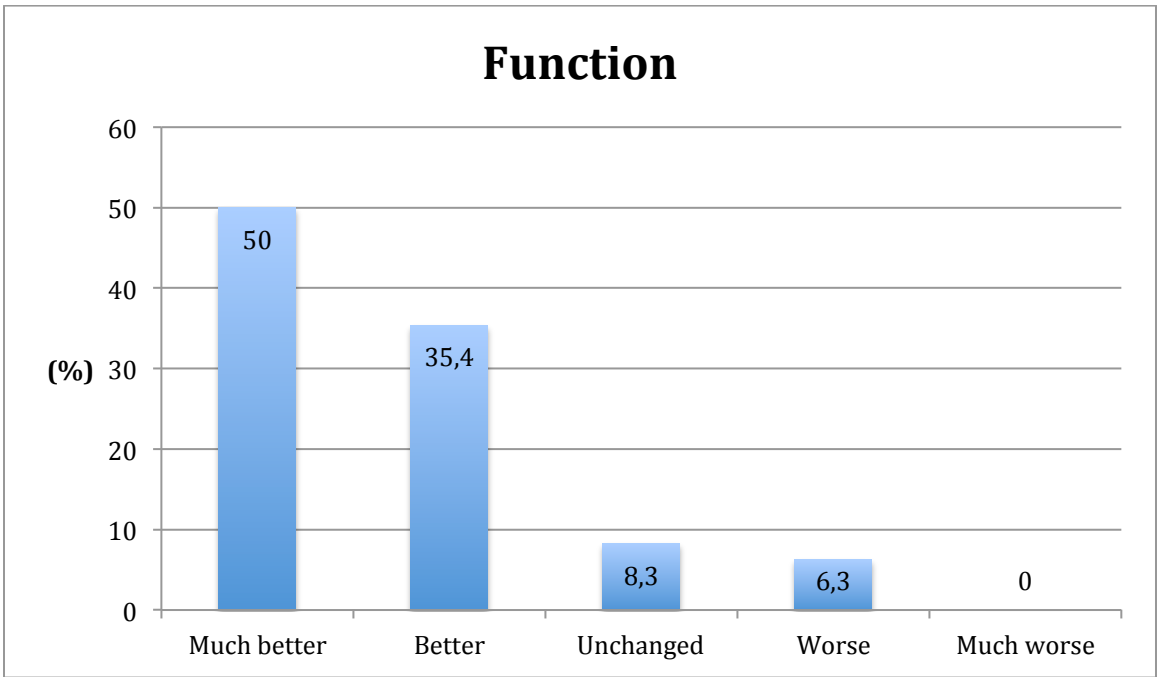


Figure 6.12 The patients' view on the function of the knee after surgery vs. before

Function		
	n	%
Much better	24	50,0
Better	17	35,4
Unchanged	4	8,3
Worse	3	6,3
Much worse	0	0,0
<b>Total</b>	<b>48</b>	<b>100,0</b>

Table 6.12.1 The patients' view on the function of the knee after surgery vs. before

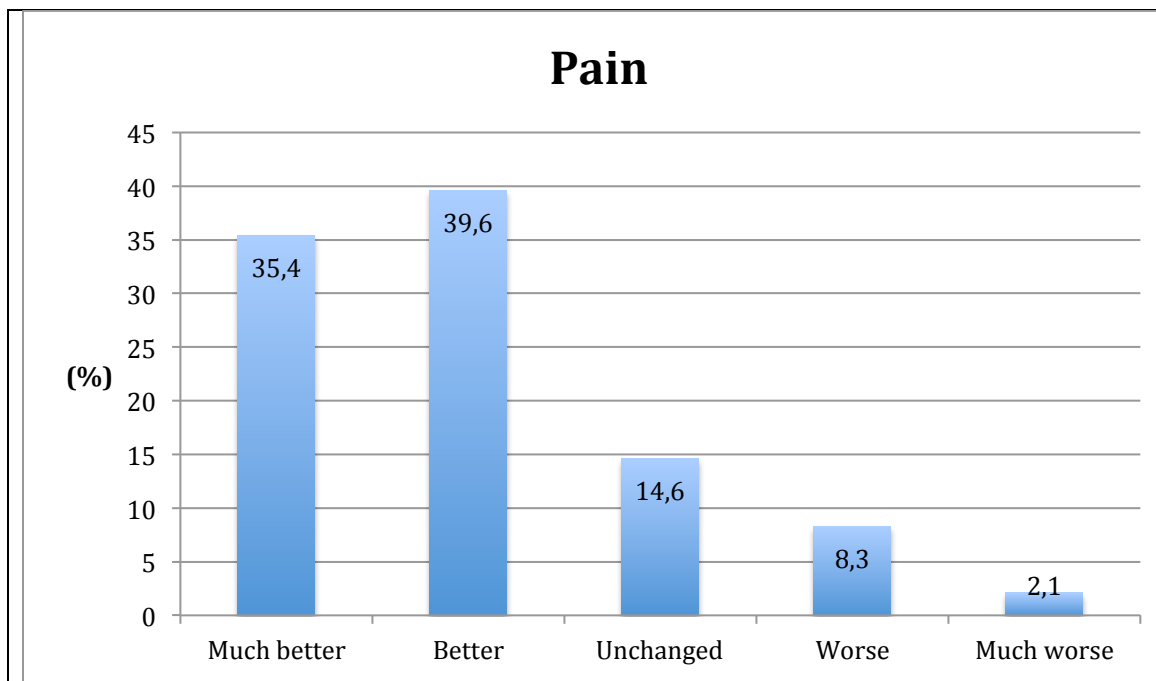


Figure 6.13 The patients' view on the pain in the knee after surgery vs. before

**Pain**

	n	%
<b>Much better</b>	17	35,4
<b>Better</b>	19	39,6
<b>Unchanged</b>	7	14,6
<b>Worse</b>	4	8,3
<b>Much worse</b>	1	2,1
<b>Total</b>	<b>48</b>	<b>100,0</b>

Figure 6.13.1 The patients' view on the pain in the knee after surgery vs. before

## Outpatient surgery

### Discharged the same day

	<b>n</b>	<b>%</b>
<b>Yes</b>	43	89,6
<b>No</b>	5	10,4
<b>Total</b>	<b>48</b>	<b>100,0</b>

Table 6.14 Were the patients discharged the same day

### Enough information

	<b>n</b>	<b>%</b>
<b>Yes</b>	37	77,1
<b>No</b>	11	22,9
<b>Total</b>	<b>48</b>	<b>100,0</b>

Table 6.15 Did they get enough information before leaving the hospital

### Ready to leave

	<b>n</b>	<b>%</b>
<b>Yes</b>	35	72,9
<b>No</b>	11	22,9
<b>Yes and No</b>	2	4,2
<b>Total</b>	<b>48</b>	<b>100,0</b>

Table 6.16 Did they feel ready to leave the hospital when discharged

### Satisfaction

	<b>n</b>	<b>%</b>
<b>Very satisfied</b>	26	54,1
<b>Satisfied</b>	19	39,6
<b>No opinion</b>	0	0,0
<b>Unsatisfied</b>	3	6,3
<b>Very unsatisfied</b>	0	0,0
	<b>48</b>	<b>100,0</b>

Table 6.17 Satisfaction with outpatient surgery

## Tegnér PRE TRAUMA/POST OP

Age	Pre trauma	Post OP	Difference
<21	8,5	5,6	- 2,9
21-30	8,5	5,7	- 2,8
31-40	6,2	4,1	- 2,1
41-50	5,1	3,8	- 1,4
51+	4	4,3	+ 0,3

Table 6.18 Tegnér score by age group before injury and after surgery

Gender	Pre trauma	Post OP	Difference
Woman	6	4,2	- 1,8
Man	7,3	5,2	- 2,1

Table 6.19 Tegnér score by gender before injury and after surgery

### Does your knee prevent you from activities?

	n	%
Yes	23	48,9
No	17	36,2
Haven't tried	7	14,9
<b>Total</b>	<b>47</b>	<b>100,0</b>

One didn't answer

Table 6.20 Does the knee prevent the patient to go back to former activity

### Would you go through the same surgery again if you knew the outcome?

	n	%
Yes	41	87,3
No	5	10,6
Don't know	1	2,1
	<b>47</b>	<b>100,00</b>

One didn't answer

Table 6.21 Would the patient go through the same surgery again if he or she knew the outcome

## 2004-2007 (1) vs. 2008-2010

	2004-2007	2008-2010
<b>Mean Lysholm score</b>	80,94	80,21
<b>No complications</b>	80,0 %	71,0 %
<b>New ACL surgery</b>	6,4 %	0 %

### 6.22.1 Outcome after ACL surgery

	2004-2007	2008-2010
<b>Stability</b>	84,5%	87,5%
<b>Pain</b>	75,7%	75,0%
<b>Function</b>	79,1%	85,4%

### 6.22.2 Outcome after ACL surgery

	2004-2007	2008-2010
<b>Discharged the same day</b>	83,6%	89,6%
<b>Enough information</b>	90,0 %	77,1%
<b>Ready to leave</b>	76,4%	72,9%
<b>Satisfied</b>	80,9%	93,7%
<b>Would you go through the same surgery again?</b>	90,9%	87,3%

### 6.23 Experiences of the patients

## Analytical statistics

Chi squared test N=48	Change:	Totally:	p-value
Pain	75% better 14,6% no change 10,4% worse	Better	<0.001
Stability	87,5% better 4,2% no change 8,3% worse	Better	<0.001
Function	85,4% better 8,3% no change 6,3% worse	Better	<0.001

*6.24 Chi squared test for change in pain, stability and function after surgery compared to injured knee before surgery.*

H <sub>0</sub>	Pain, stability and function after surgery compared to before surgery	Test	p-value
Women have similar change in pain as men	Women: 67,7% better, 33,3% worse/no change Men: 83,4% better, 16,6% worse/no change	Chi square	< 0,10
Women have similar change in stability as men	Women: 83,4% better, 16,6% worse/no change Men: 91,7% better, 8,3 % worse/no change	Chi square	< 0,50
Women have similar change in function as men	Women: 79,2% better, 20,8% worse/no change Men: 91,7% better, 8,3 % worse/no change	Chi square	< 0,50

*6.25 Test of improvement in pain, stability and function between men and women.*

H <sub>0</sub>	Pain, stability and function after surgery compared to before surgery	Test	p-value
Patients under 30 years of age have better change in pain than patients over 30 years of age	<30 years: 65 % better, 35 % worse/no change  >30 years: 82,1% better, 17,9% worse/no change	Chi square	< 0,10
Patients under 30 years of age have better change in stability than patients over 30 years of age	<30 years: 75 % better, 25 % worse/no change  >30 years: 96,4% better, 3,6 % worse/no change	Chi square	< 0,05
Patients under 30 years of age have better change in function than patients over 30 years of age	<30 years: 75 % better, 25 % worse/no change  >30 years: 92,9% better, 7,1 % worse/no change	Chi square	< 0,10

*6.26 Test of improvement in pain, stability and function in age groups under and over 30 years of age.*



H <sub>0</sub>	Possibility to continue at the same activity level	Test	p-value
Patients with high Tegnér score before injury have the same possibility to continue at the same activity level after surgery as those with low Tegnér score before injury.	Tegnér score 6-10: 63,0 prevented 18,5% not prevented 18,5% has not tried  Tegnér score 0-5: 29,4% prevented 64,7% not prevented 5,9% has not tried	Chi square	< 0,01

*6.27 Comparing activity level before injury and possibility to continue at the same activity level after surgery and rehab*

H <sub>0</sub>	Felt ready to leave	Test	p-value
No correlation between feeling ready to leave and receiving enough information	Those that felt they had received enough information: 81,1% felt ready to leave  Those that felt they had not received enough information: 63,6% felt ready to leave	Chi square	< 0,50

*6.28 Is there a correlation between feeling ready to leave the hospital and receiving enough information before being discharged?*

## 7. DISCUSSION

The age distribution shows a quite young patient group. According to the case sheets the youngest was 16 years and the oldest 56 years by time of surgery. The patient's age when answering the questionnaire is the age registered in this survey. Since the questionnaires were sent out minimum one year after surgery the patients were 1-4 years younger when they were operated. The gender distribution was very equal, 50% women and 50% men.

Mean Lysholm score minimum one year after reconstruction is 80,21, which indicates a good knee function. The mean score was lower among the women; 76,37, while the men had a mean score on 84,04. 7 patients or 14,6% had a Lysholm score under 67, which is a bad knee function. 6 of these patients were women. The Lysholm score seemed to be higher the older the patient was. In age group 51+ the mean score was 92,67, while it was only 65,55 in the group under 21 years of age. Some hospitals have an age limit of 45 years of age. These results tell us that this patient group have good results after surgery and therefore it might not always be indicated to have an age limit. Previous studies have shown the same. (20)

71% did not get any complications post-operatively. 6% got superficial wound infection. 4% answered that they got septic arthritis. However, case records shows that only 1 patient out of 100 got septic arthritis, so the real number is 1%. 19% had other complications like fever. One can see that this question was difficult to answer for the patients. Complications are also subjective. No thrombosis was registered. Two complications are among the more serious ones: infection and deep vein thrombosis. Previous studies have shown that infection affect under 1% of the patients and deep vein thrombosis less than 4% of the patients. (21-22)

23% had to go through another surgery. However, none of these surgeries were a new reconstruction of the ACL. Though 18% answered that the surgery failed, most of the surgeries were done because of cartilage or scar formation. 9% had new injuries. Two patients had to remove the screw.

27,1% of the patients said that the stability of the knee was better after surgery. 60,4% said that it was much better, which gives a total of 87,5% with better knees. According to 8,3% the knee was worse. 50% reported a much better knee function and 35,4% a better function which gives a total of 85,4 with better function. 6,3% reported that the knee function was worse. When comparing pain before and after surgery, 35,4% reported that it was much better after surgery and 39,6% that it was better. Totally 75% had less pain. 8,3% reported worse and 2,1% that the pain was much worse after surgery.

When it comes to outpatient surgery, 89,6% was discharged the same day. Those that were not discharged the same day reported that they had had their surgery late in the afternoon and could therefore not be discharged the same day. Others reported that they felt sick after anaesthesia and had to stay overnight. 77,1% felt that they got enough information before being discharged from the hospital. Some patients wished that they had got better information about the importance of exercising after surgery and reported that they got different information from surgeons and physiotherapists. Others were surprised of the strong post-operative pain. 72,9% felt ready to leave when discharged. A big part of them who did not feel ready to leave were sick after anaesthesia.

54,1% was very satisfied with the overall impression of outpatient surgery and leaving the same day. 39,6 was satisfied, which gives a total of 93,7% being satisfied. 87,3% would go through the same surgery again today now that they know the outcome. A big part of the patients were very pleased with the professional staff at UNN and their kindness.

Tegnér score before injury and after surgery showed that every age group, except for the ones in age group 51+, had a lower Tegnér score after surgery. The age group of 51+ showed better Tegnér score after surgery, from 4 to 4,3. This is also an indication that a rupture to the ACL is a serious injury. Afterwards one can see that the patients had difficulties in understanding this part of the questionnaire.

48,9% answered that the knee prevents them from going back to the same activities

that they did before trauma. 14,9% has not tried to do the same activities. A majority of these patients answered that it was because of pain and instability. Many were also afraid that they would get a new injury. These figures can vary according to the patients' activity level before trauma. Results after an ACL reconstruction can vary in individuals. Some might be in good shape when they get injured and can therefore have an easier way back.

When it comes to the results 2004-2007 versus those in 2008-2010 the Lysholm score was slightly lower 2008-2010. 71% did not have any complications, while 80% did not have any in 2004-2007. A really good result is the one that tells that no one had to do a new ACL reconstruction in the newer study, while it in the older study showed that 6,4% had to go through a new surgery.

Patients reported improved stability and function in this newer study, while pain was quite the same.

83,6% was discharged the same day in 2004-2007, while 89,6% was discharged the same day in 2008-2010. That shows an improvement. 77,1% felt that they got enough information, compared to 90% in the older study. In this newer study, less felt ready to leave when discharged; 72,9% vs. 76,4% in the older study. The satisfaction figures are impressive. In the newer study 93,7% was satisfied compared to 80,9% in the older study. Although some patients did not feel ready to leave when they were discharged and some felt that they did not get enough information, the satisfaction level was higher.

The amount of patients that would go through the same surgery again now that they know the outcome was satisfying, 87,3%. In the older study 90,9% answered that they would do so.

The questionnaires in this study were sent out only once. When the previous study was made, the questionnaires were sent out twice. 68,5% responded to the older survey, when 48,9% responded to this newer survey. This might also affect the results.

The analytical statistics tell us more about correlation and significant differences in

groups. When analysing pain, function and stability between men and women and in different age groups, over and under 30 years of age one could not point out significant differences except for in one group. When doing a chi-squared test we could see that patients over 30 years of age have a better change in stability than patients under 30 years of age ( $p < 0,05$ ). Generally, the study shows improved stability, better function and less pain after surgery in all the groups ( $p < 0,001$ ).

There were no correlation between getting enough information before leaving the hospital and feeling ready to be discharged.

Patients with high Tegnér score before injury have not the same possibility to continue at the same activity level after surgery as those with low Tegnér score before injury ( $p < 0,01$ ). The questionnaires were sent out minimum one year after surgery and many answered that they were afraid that they would get a new injury so they have not continued at the same activity level. Many of these were exercising many times a week and also competing at national elite level. This might be more difficult to accomplish than what those that are exercising more seldom are doing.

The questionnaires that give us the Tegnér and Lysholm score are totally based on the patient's subjective experience. Some patients might think that the ACL surgery was not successful, although the reason might be a complex injury and other problems in the knee, for example with menisci or bone structure.

A possibility could have been that patients answered these questionnaires by name so one could have checked each and every patient's case sheet.

The development in medicine is rapid and new methods are being presented continuously. What the future will bring for ACL surgeries is hard to say. Discussion continues about choice of graft and rehabilitation techniques.

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