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# *CASE REPORT:* Isokinetic training after an ACL reconstruction

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The International Ski Federation (FIS) Injury Surveillance System (ISS) has reported that during the five-month winter season, **one in every three World Cup (WC) alpine skiers** sustains an injury. Similar to recreational skiers, the **most common problem in ski racers is knee injuries**, and the **most frequent specific diagnosis is a complete rupture of the anterior cruciate ligament (ACL)**.

*Bere, 2012*

**World Cup Saison 2015/2016:**

**9 ACL ruptures!!!**



FIS International  
Injury Surveillance  
System - FIS ISS



Oslo Sports Trauma  
RESEARCH CENTER





# “the fastest non-motorized sport on Earth” and “the riskiest sport undertaken by adults on a routine basis”

*Boutin & Fritz, 2005*



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## RETURN TO SPORT after ACL rupture and reconstruction

- on average 81% of people returned to any sport, 65% returned to their preinjury level of sport and **only 55% returned to competitive level sport** after surgery (*Arden et al., 2014*)
- **less than 50% are 3.5 years after the injury still active** in competitive sports (*Kalberer et al., 2013*)
- age, gender, time between injury and OP and choice of graft had no influence (*Lentz et al., 2012*)
- what are the **key points in rehabilitation** (*Lentz et al., 2012*)
  - IKDC Score >93 points (subjective knee evaluation form)
  - Hydrops ↓, Pain ↓, instability episodes ↓, movement anxiety (kinesiophobia) ↓
  - **strenght quadriceps** ↑
- particular attention is paid to strengthening the quadriceps, because quadriceps weakness (=>stability weakness) can persist for 2 years after surgery (*Risberg et al., 1999, 2004*) and can lead to patellafemoral pain and OA



## ISOKINETIC Training (after ACL reconstruction)

[www.biodex.com](http://www.biodex.com)

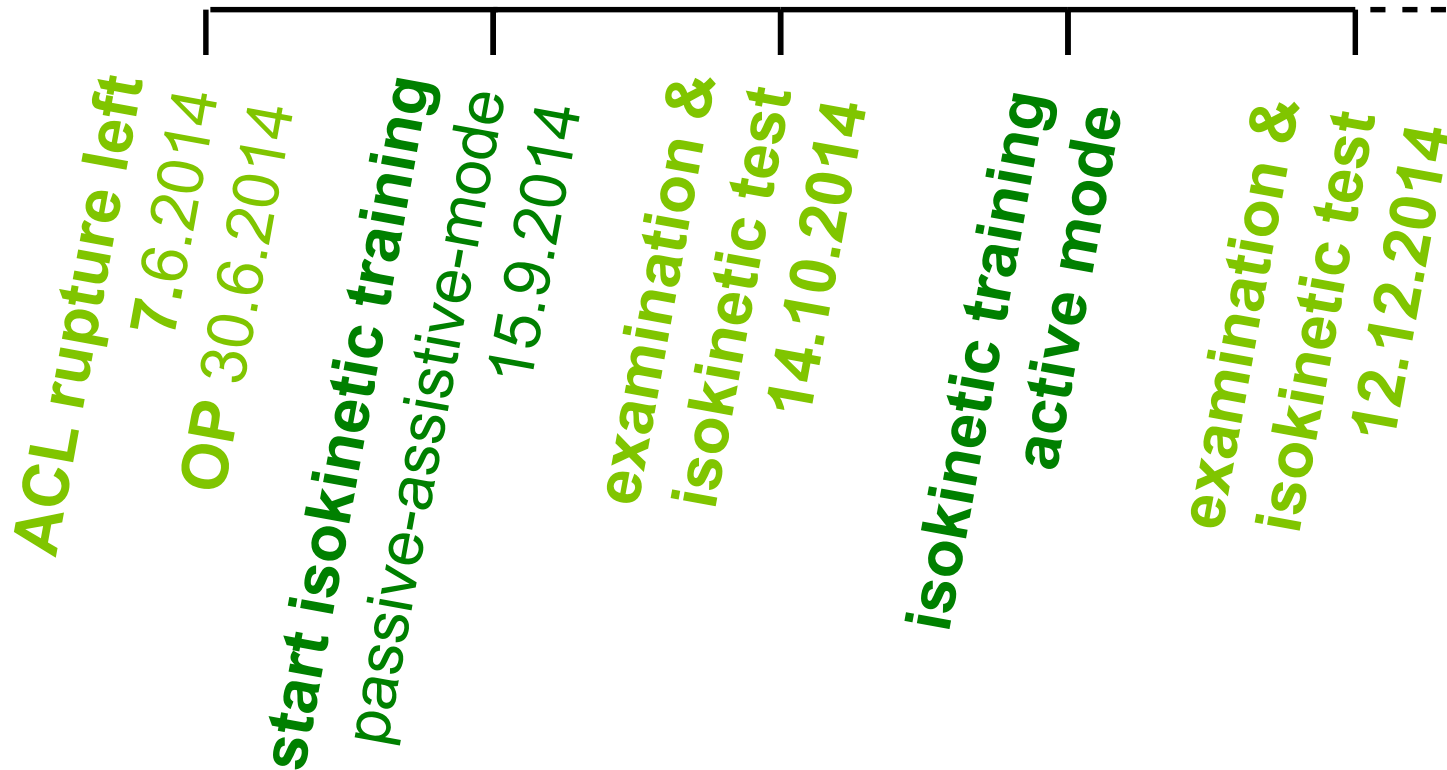
- provides several benefits in rehabilitation processes
  - relatively **controlled and safe exercise** (testing and training)
  - **isolated training** of defined muscles
  - ROM and motion speed are adjustable
  - **accomodating resistance** to prevent (re)injury
  - **feedback** for the patient and the therapist
  - information about possible **exercise overloads and patients compliance**
  - **full documentation**
- in this case report our aim was to:
  - **intramuscular coordination** ↑
  - **monitor** the training progress
  - **avoid training overloads**
  - avoid deceleration of rehabilitation





## case report - timetable

male, 22y, height 1.76, 74 kg, patella tendon graft surgery;



**return  
to  
sports**

**15.1.2015**

*so far  
so good*



ACL rupture  
 7.6.2014  
 OP 30.6.2014

start isokinetic training  
 passive-assistive-mode  
 15.9.2014

examination &  
 isokinetic test  
 14.10.2014

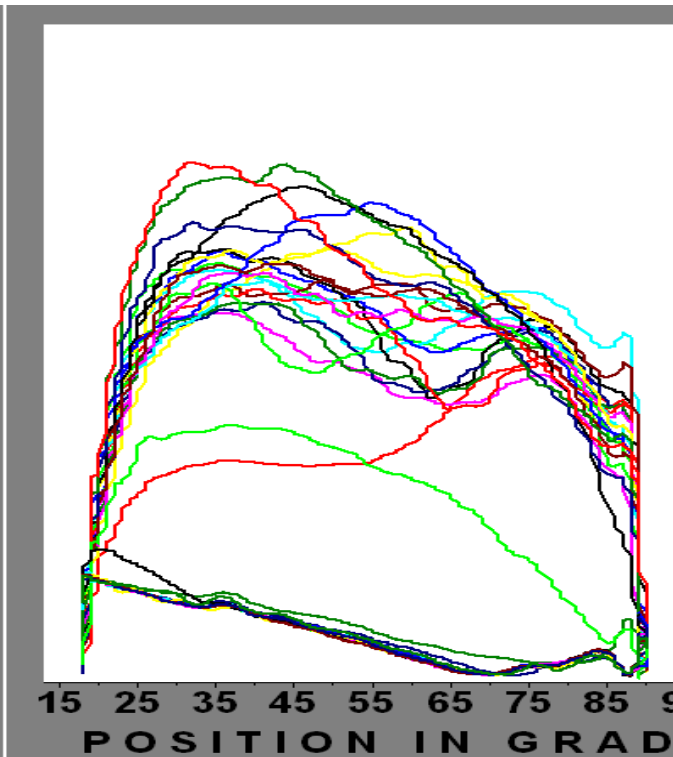
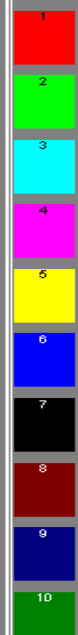
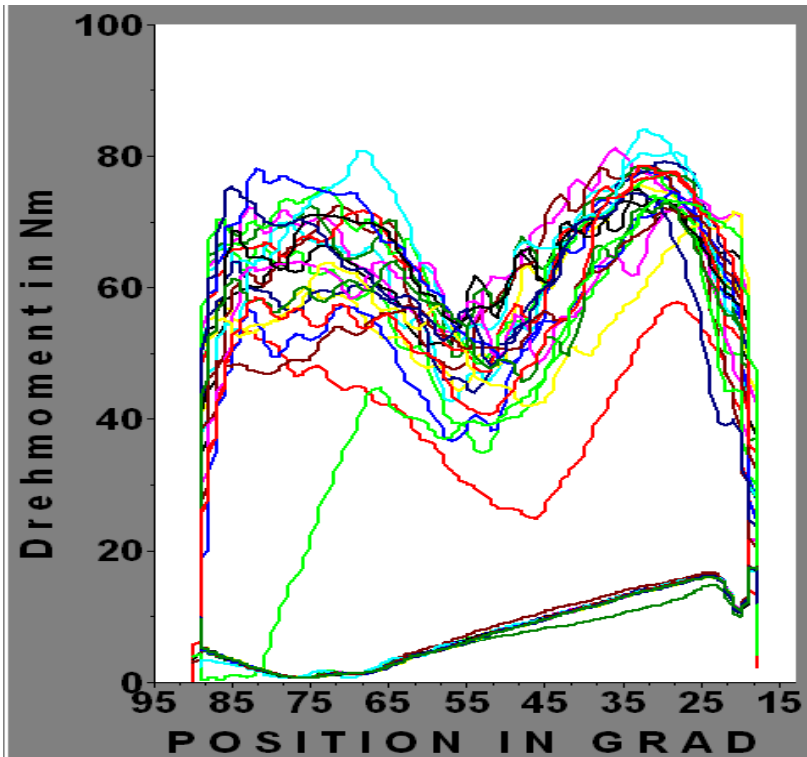
isokinetic training  
 active mode

examination &  
 isokinetic test  
 12.12.2014

## case report – week 12 (2nd training session)

mode: passive-assistive isokinetic

training session: 2x/week, 5x20 reps, 60°/s, ROM 90-20





ACL rupture  
7.6.2014  
OP 30.6.2014

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passive-assistive-mode  
15.9.2014

examination &  
isokinetic test  
14.10.2014

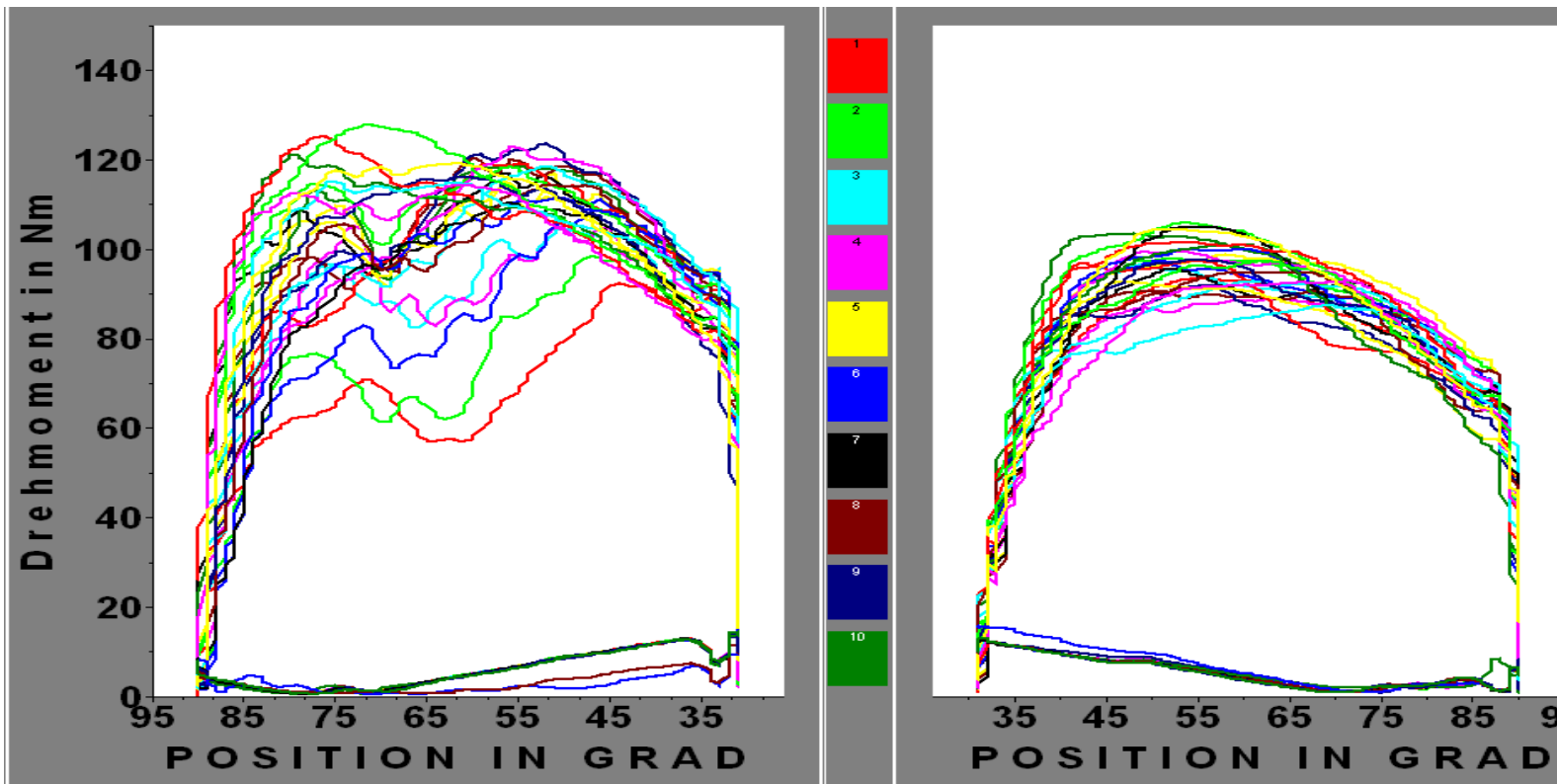
isokinetic training  
active mode

examination &  
isokinetic test  
12.12.2014

## case report – week 15 (7th training session)

mode: passive-assistive isokinetic

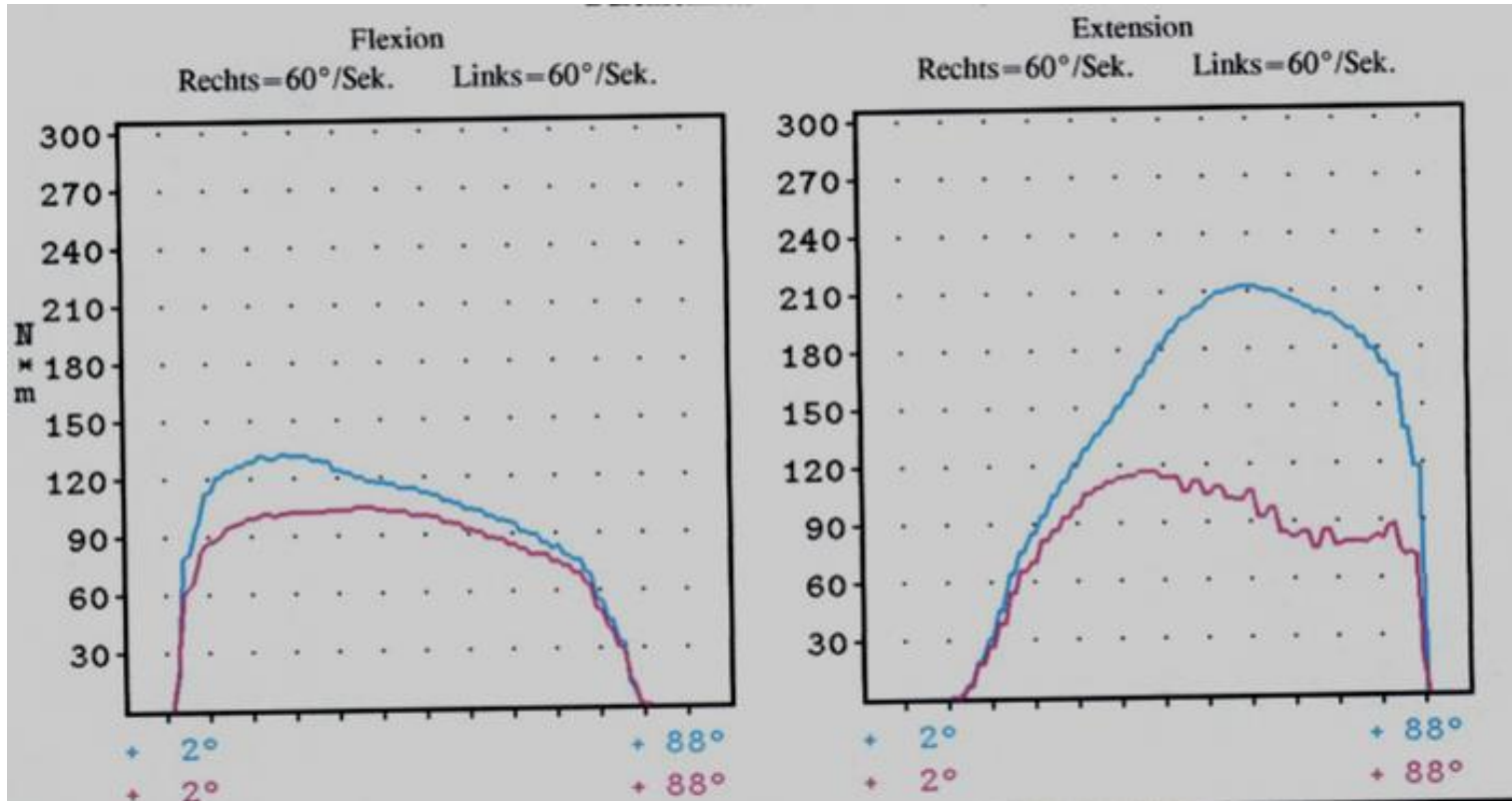
training session: 2x/week, 5x20 reps, 60°/s, ROM 90-20





## case report – week 16 (1st examination at surgeon)

testing mode: isokinetic 60°/s (8rep) & 180°/s (8rep)



ACL rupture  
7.6.2014  
OP 30.6.2014

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passive-assistive-mode  
15.9.2014

examination &  
isokinetic test  
14.10.2014

isokinetic training  
active mode

examination &  
isokinetic test  
12.12.2014



ACL rupture  
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OP 30.6.2014

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examination &  
isokinetic test  
14.10.2014

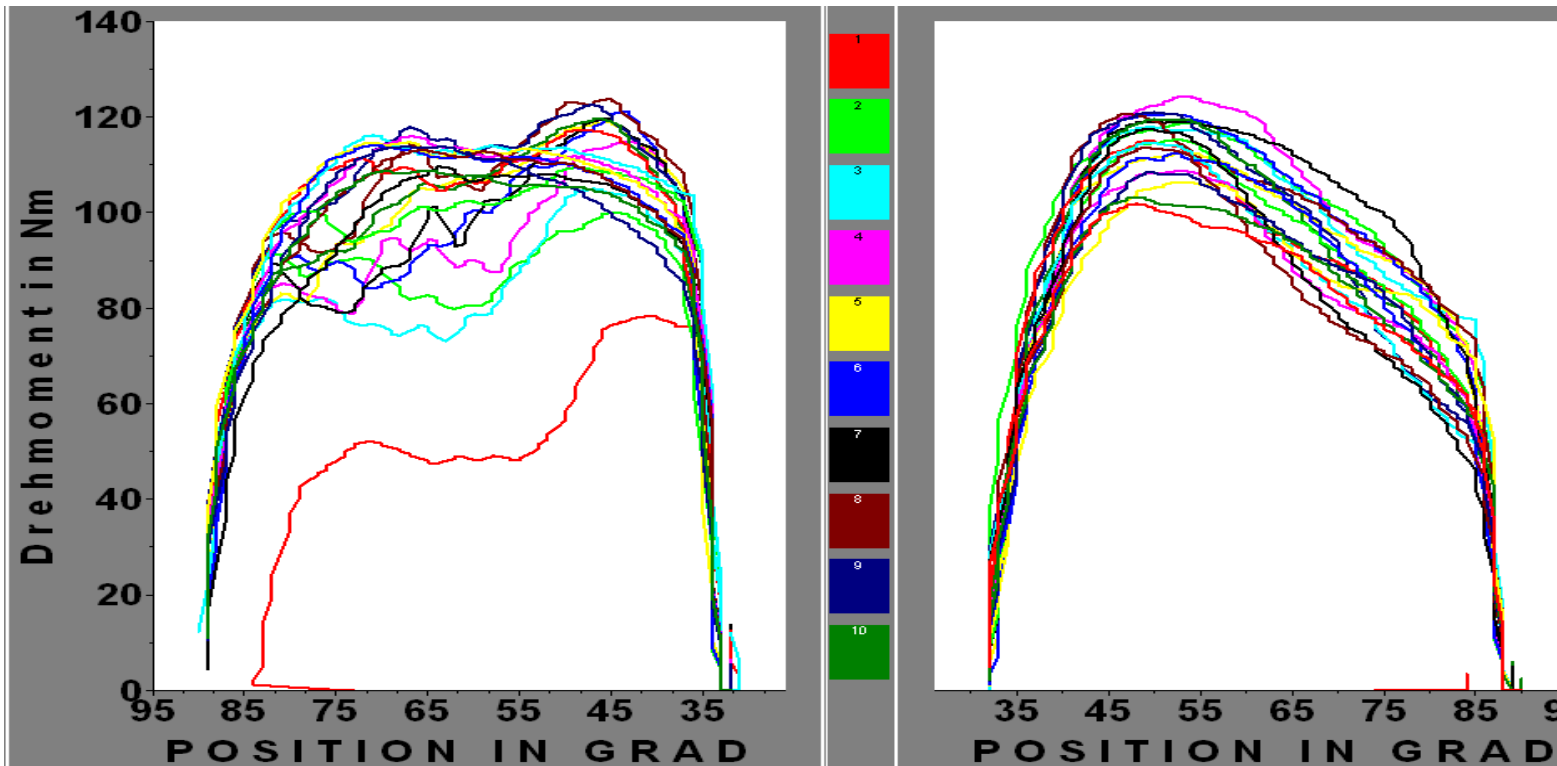
isokinetic training  
active mode

examination &  
isokinetic test  
12.12.2014

## case report – week 16 (8th training session)

mode: **active** isokintec

training session: 2x/week, 5x8-20 reps, 90-60°/s, ROM 90-20

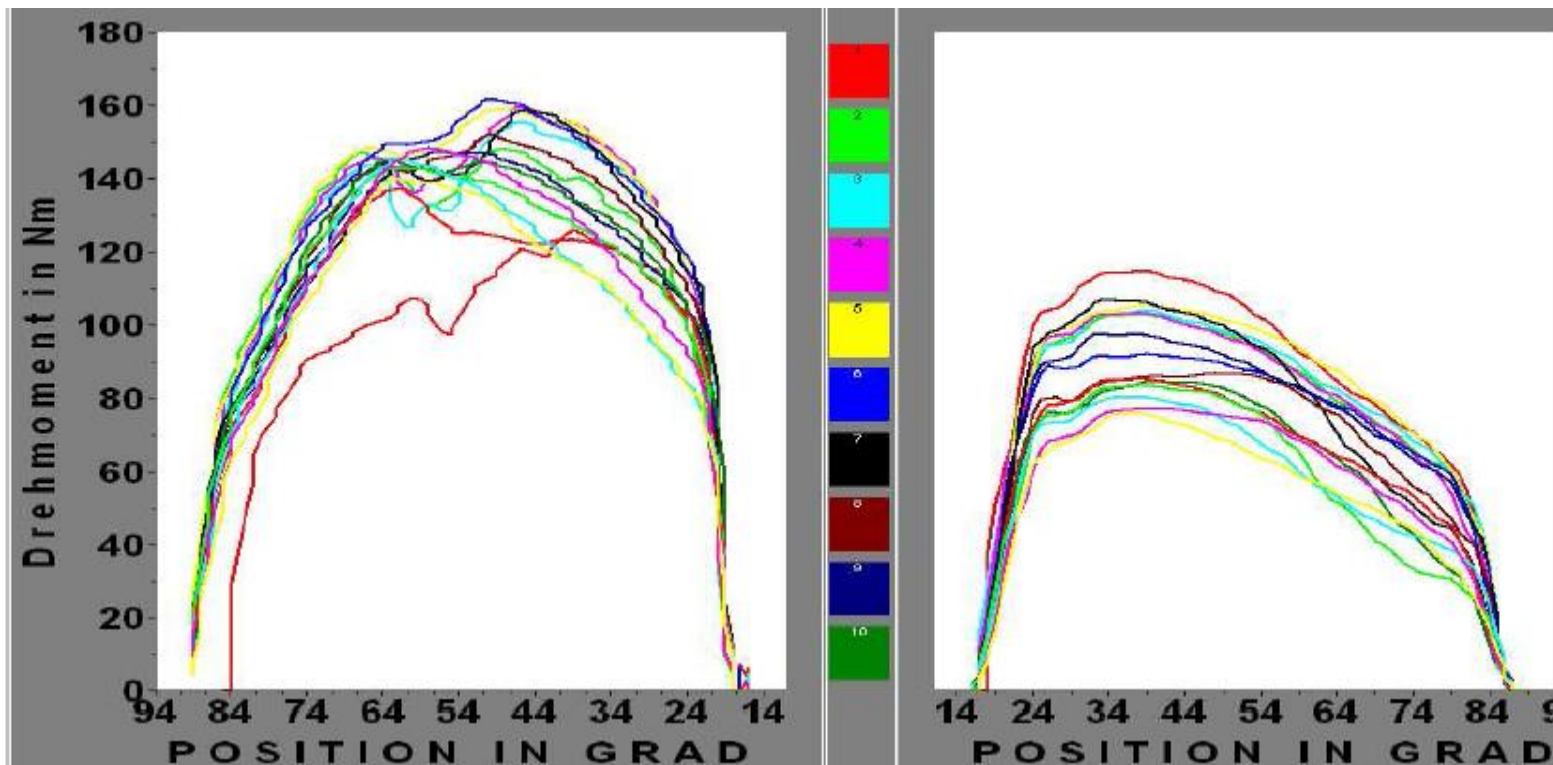




## case report – week 20 (15th training session)

mode: active isokintec

training session: 2x/week, 5x8-20 reps, 180-60°/s, ROM 90-0



ACL rupture  
7.6.2014  
OP 30.6.2014

start isokinetic training  
passive-assistive-mode  
15.9.2014

examination &  
isokinetic test  
14.10.2014

isokinetic training  
active mode

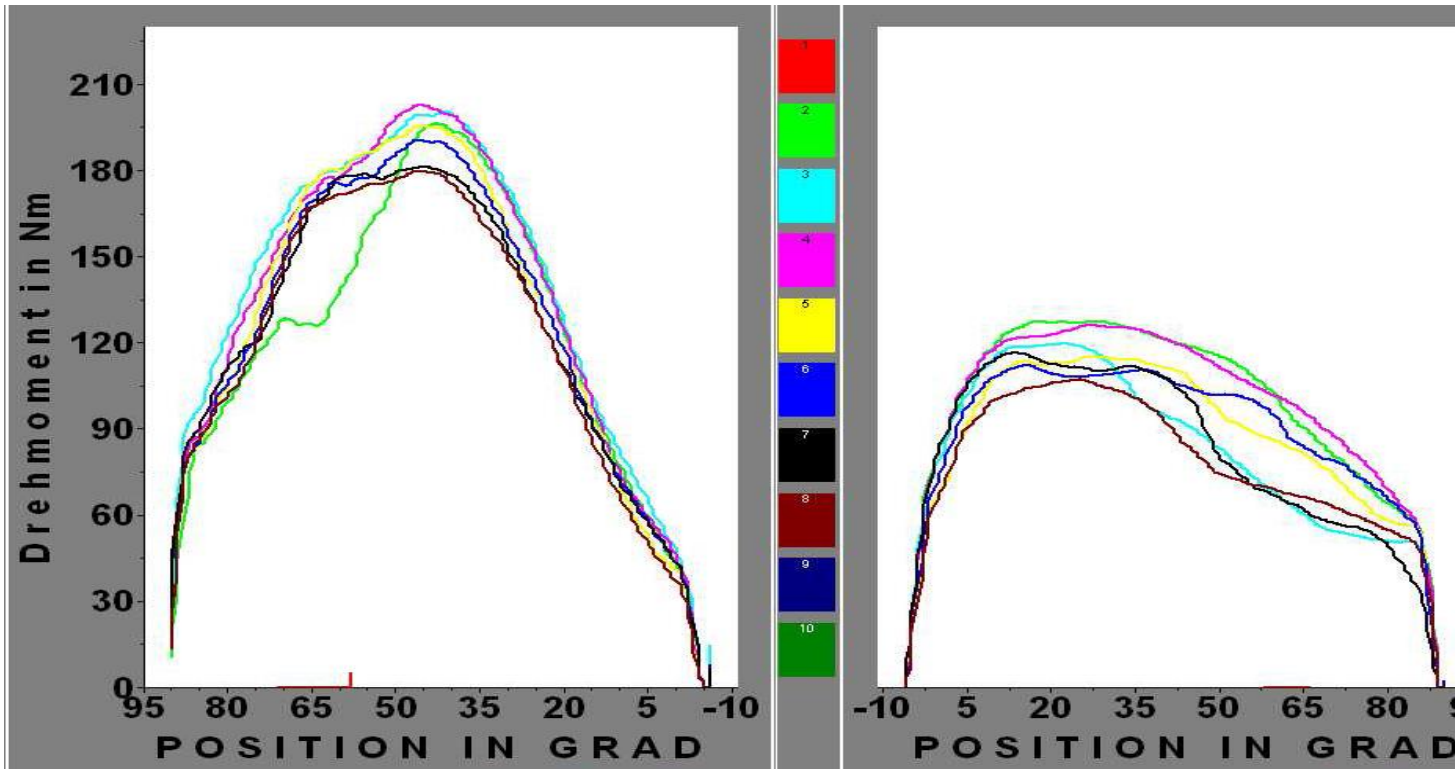
examination &  
isokinetic test  
12.12.2014



## case report – week 24 (20th training session)

mode: active isokintec

training session: 2x/week, 5x8-20 reps, 180-60°/s, ROM 90-0



ACL rupture  
7.6.2014  
OP 30.6.2014

start isokinetic training  
passive-assistive-mode  
15.9.2014

examination &  
isokinetic test  
14.10.2014

isokinetic training  
active mode

examination &  
isokinetic test  
12.12.2014



ACL rupture  
7.6.2014  
OP 30.6.2014

start isokinetic training  
passive-assistive-mode  
15.9.2014

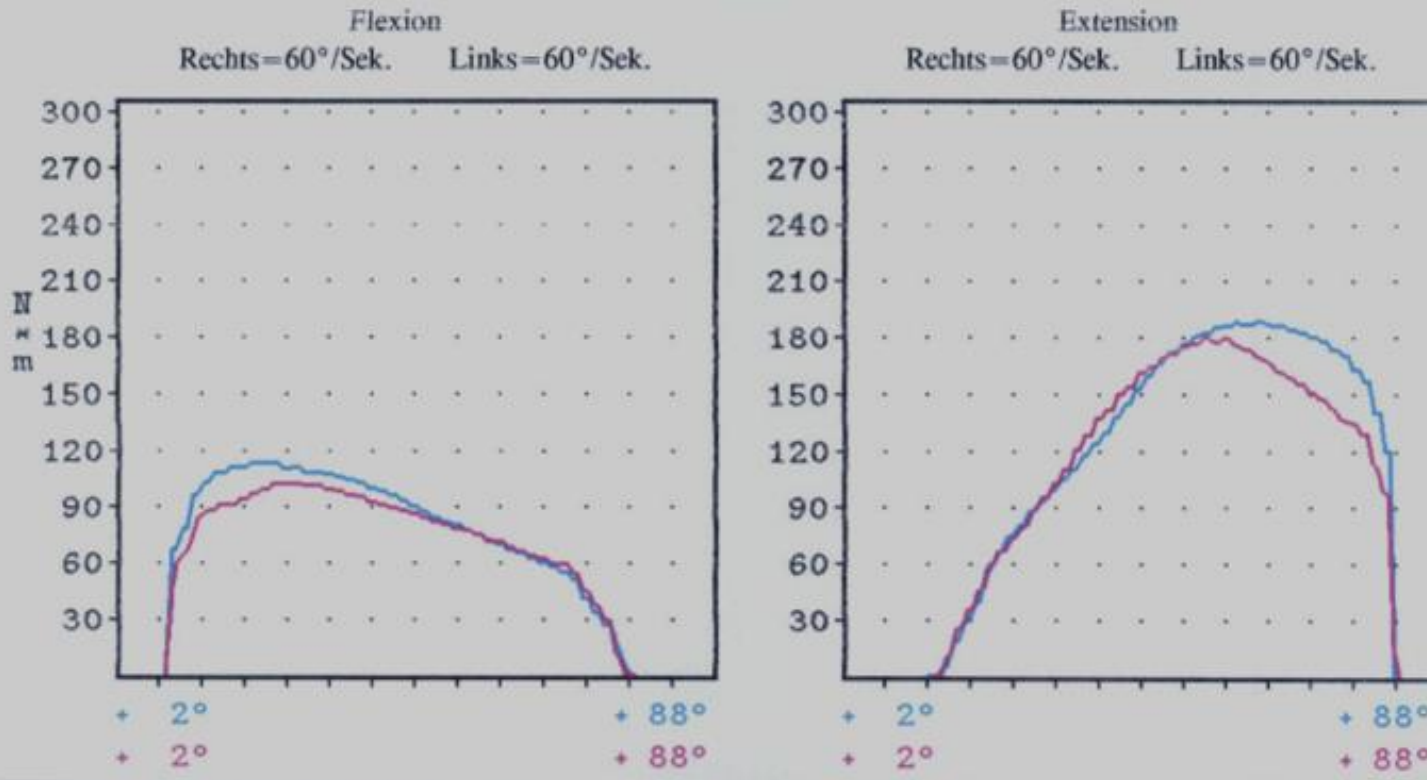
examination &  
isokinetic test  
14.10.2014

isokinetic training  
active mode

examination &  
isokinetic test  
12.12.2014

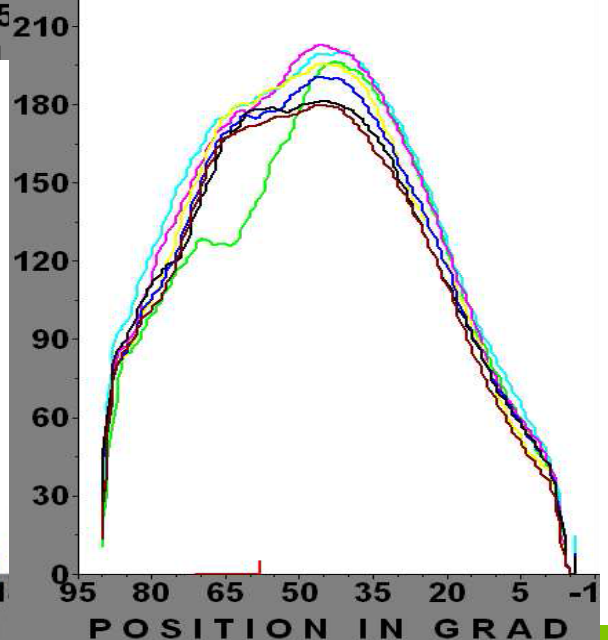
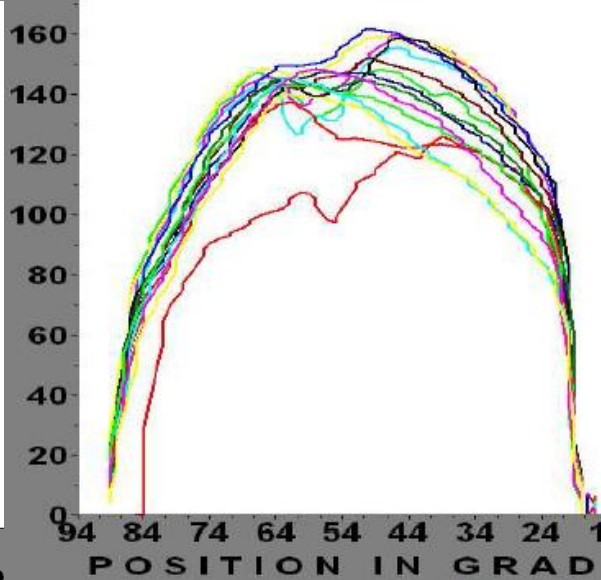
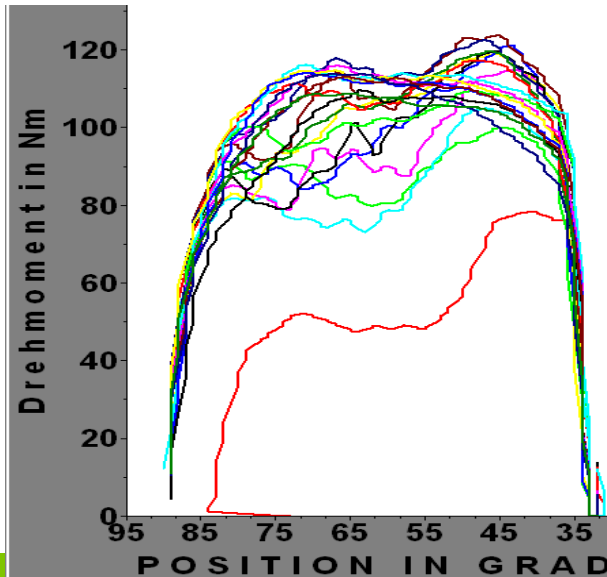
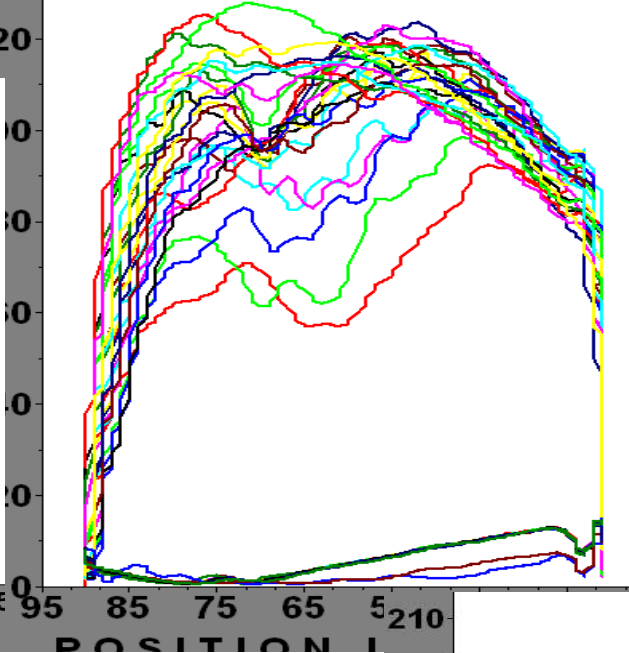
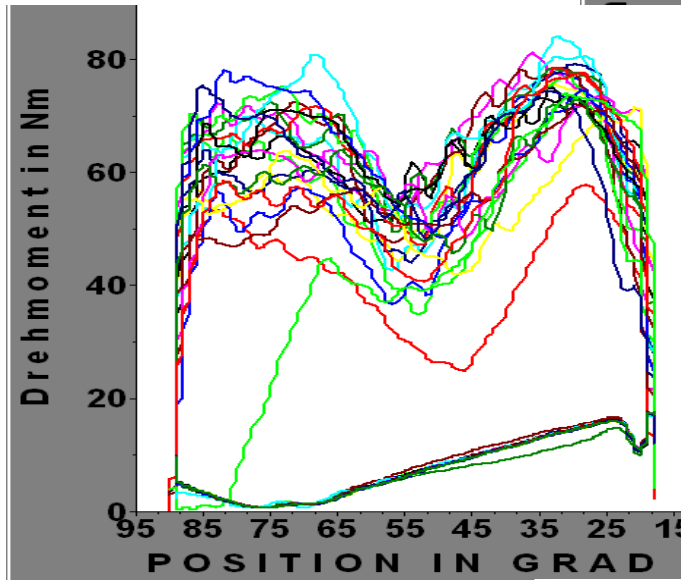
## case report – week 24 (2nd examination at surgeon)

testing mode: isokinetic 60°/s (8rep) & 180°/s (8rep)





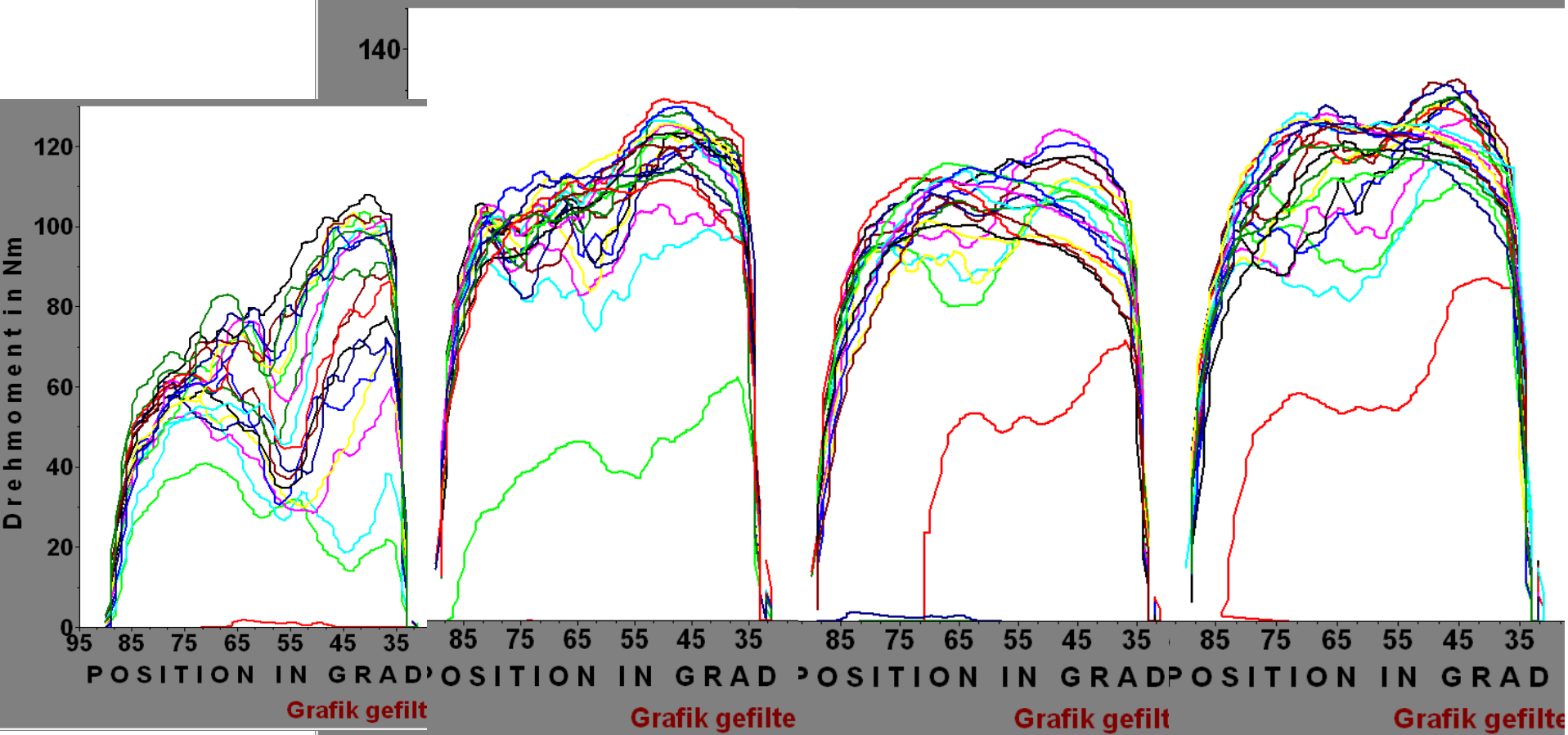
case report -  
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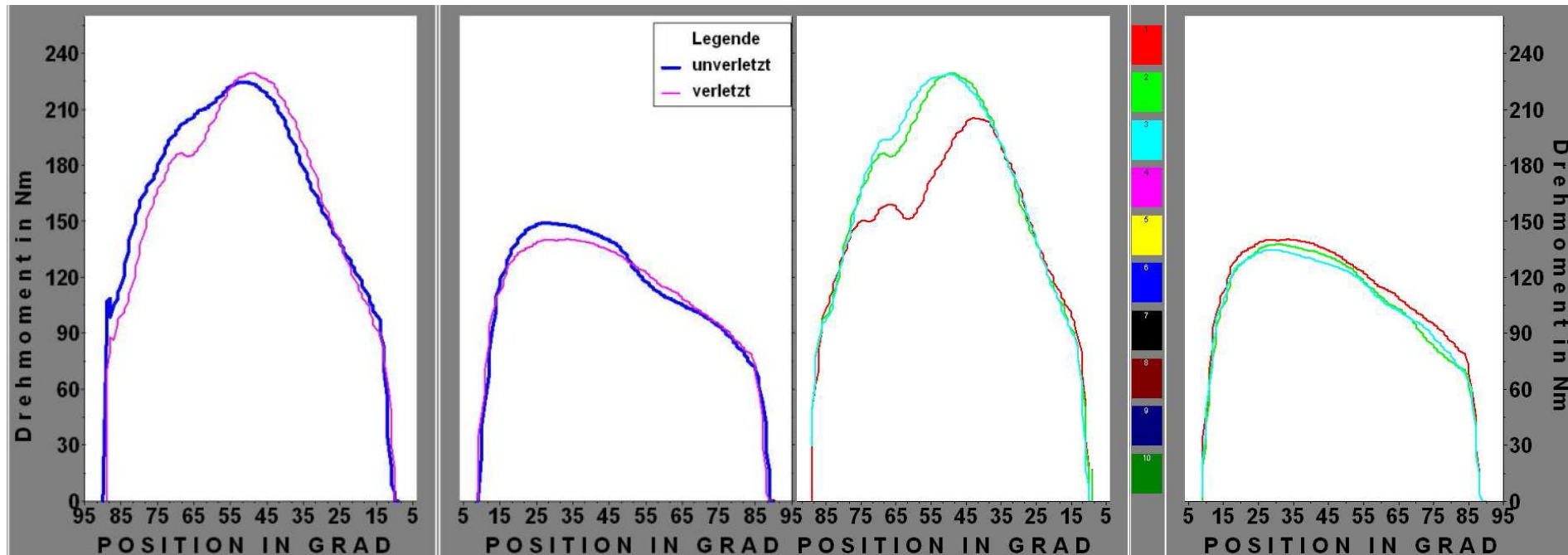
## case report – mikro (16.10)

Drehmoment gg. Position (Auswärts) gg. Position (Auswärts) gg. Position (Auswärts) gg. Position (Auswärts)



## follow up – 07/2015

- particular attention is paid to strengthening the quadriceps, because quadriceps weakness (=>stability weakness) can persist for 2 years after surgery (*Risberg et al., 1999, 2004*) and can lead to patellafemoral pain and OA





## case report – take home messages

- **characteristics and progress** within 20 training sessions
- **characteristics and progress within one training unit**  
→ high intensity isokinetic training improves intramuscular coordination
- **special warming up** for intramuscular coordination **is needed**
- **isokinetic training** in acl rehabilitation **seems to work well**
  - as a training system (intramuscular coordination)
  - as a feedback system (for the patient and the therapist)
  - as an additional training topic
  - should become a standard procedure for monitoring and completing rehabilitation processes concerning acl ruptures



**Thanks for your attention!**