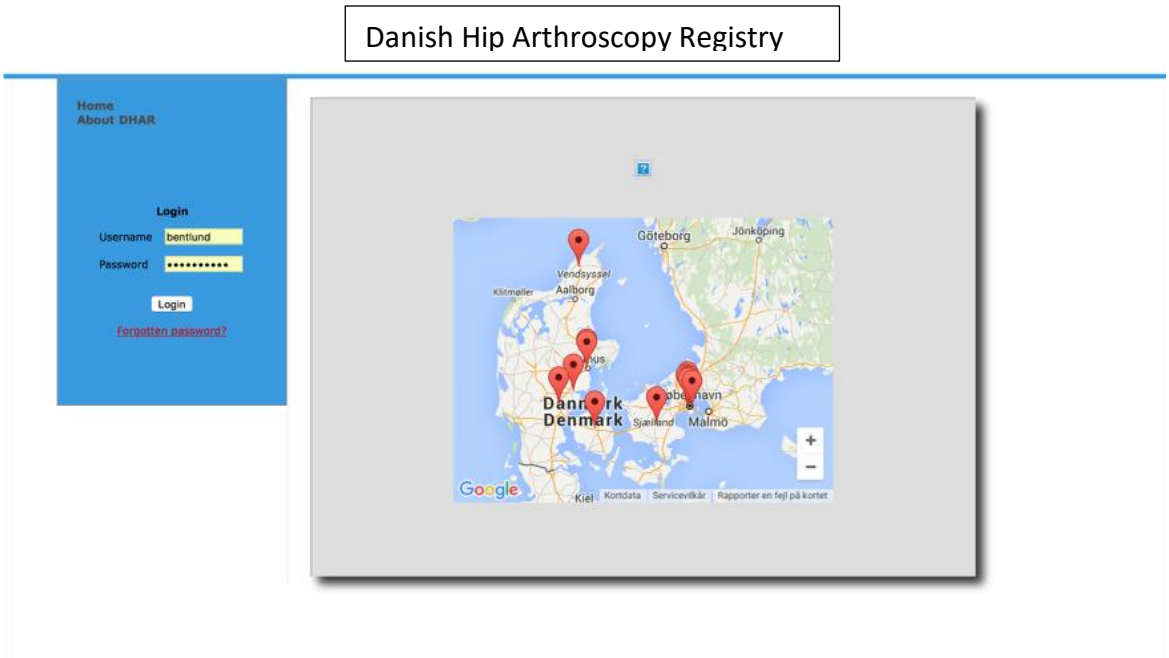
The Danish Hip Arthroscopy Registry
DHAR

Annual report 2019



Steering committee:

Bent Lund, Horsens Regional Hospital, chairman
Otto Kraemer, Hvidovre Hospital
Per Hölmich, Hvidovre Hospital
Niels Maagaard, Odense University Hospital
Søren Winge, CPH Privathospital
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Introduction

Since 2010 hip arthroscopies have only been performed at a limited number of hospitals with specific levels of expertise in Denmark. This was based on a new Health law regulating various treatments. Furthermore, it was demanded that the hospitals and clinics registered the procedures they performed. This gave the inspiration for a national hip arthroscopy registry. The Danish Hip Arthroscopy Registry (DHAR) was initiated in 2012 and the development was funded by a grant from The Danish Society for Arthroscopy and Sportstraumatology (SAKS). The DHAR and the British Non-Arthroplasty Hip Registry (NAHR) are the only national non-arthroplasty registries existing so far.

DHAR has been open to submissions on-line since the beginning of 2012 and the database structure has been modified several times over the years, mainly because minor flaws and programming errors had to be adjusted and corrected. The Steering Committee meets twice a year and ad-hoc decisions and data requests are handled pr. e-mail og Skype meetings.

In 2016 the first full Annual report was published and since then we have published an annual report. Peer reviewed articles based on data from the Registry will also be published and in fact several have already been published. See publication list [1–7].

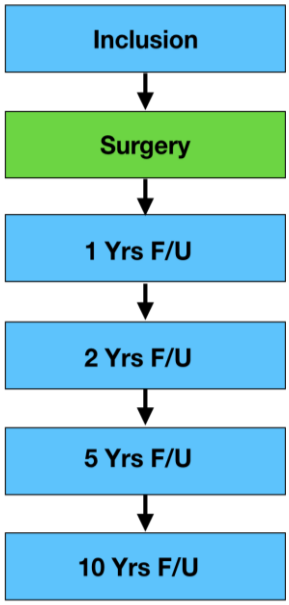
DHAR is run by a voluntary effort among the participating surgeons and the actual database is run by Procordo Inc., a Danish software company hosting a variety of orthopedic registries.

DHAR is solely funded economically by the participating hospitals and private clinics.

Bent Lund
Chairman of the Steering Committee.

DHAR

The Registry is built around a flowchart, which forms the basic structure and makes it possible to access the various parts of the Registry in the flowchart.



The patients access the Registry through a "kiosk", where they can enter their data on-line and fill out the pre-scores in the Patient Related Outcome Measures (PROM). At the time of surgery, the surgeon enters the operative findings and other variables on-line.

When the patients are signed up for hip arthroscopy, they enter the following Patient Related Outcome Measures (PROM) into the registry: HAGOS, $iHOT_{12}$, HSAS, VAS-overall hip function, NRS pain-rest and NRS pain-walk and EQ5D scores.

The surgeons enter the following data in the registry at the time of surgery: various radiographic measurements, previous surgery, anesthesia, antibiotics, DVT-prophylaxis, labral tear, cartilage lesions, other injuries, OR-time, traction time, surgical procedures, number of anchors and type, cartilage treatment, bony work, extraarticular surgery and perioperative complications.

The Registry has an automatic follow-up and the patients get an e-mail at 1, 2, 5 and 10 years with a link to an on-line questionnaire. If they don't respond another e-mail is automatically sent as a reminder.

The registry makes it possible to extract data on the actual patient, but also, on groups of patients or different treatment modalities or types of injuries. All surgeons have access to their own data, but only the steering committee can gain full access. The database is secure and not open to public access. Data can only be made available on written request and with a research protocol stating the type of request. Permission has to be granted by the Danish Data Protection Agency.

Quality indicators

Completeness (surgeon) DHAR/LPR (Danish National Patients Registry) **Target 90 %**

Table 1. Number of Hip Arthroscopic procedures reported in DHAR and LPR

Completeness	2012	2013	2014	2015	2016	2017	2018*
DHAR	**450**	**709**	**936**	**921**	**803**	**757**	**505**
LPR	**576**	**827**	**1201**	**1042**	**826**	**880**	**571**
DHAR/LPR (%)	**78.1**	**85.7**	**77.9**	**88.4**	**97.2**	**86.0**	**88.4**

***Data included up to September 2018. Due to procedural changes accessing data from the National Patient Registries, data is not available after September 2018.**

Completeness of PROMS (patient)/DHAR (surgeon) **Target 70%**

Table 2. Number of PROMs completed compared to surgical registrations in DHAR

Completeness PROMS (n (%))	2012-2016	2017	2018	2019	Total
Pre	**1951** (52)	**392** (50)	**584** (70)	**607** (69)	**3534** (57)
1 year	**2286** (61)	**418** (54)	**449** (54)	-	**3153** (59)
2 years	**1861** (54)	**302** (40)	-	-	**2163** (51)
5 years	**687** (45)	-	-	-	**687** (45)

QoL improvement >25 points (number (%)) **Target 60 %**

Table 3. The number of patients reaching an improvement in HAGOS item QoL of more than 25 points at 1, 2 and 5 years

HAGOS QOL (n (%))	2012-2016	2017	2018	2019	Total
1 year	**530** (45)	**101** (43)	**162** (44)	-	**796** (44)
2 years	**481** (50)	**82** (48)	-	-	**566** (50)
5 years	**210** (54)	-	-	-	**210** (54)

Re-arthroscopies (n (%)) **Target <10 %**

Table 4. Re-arthroscopies per year

Re-arthroscopies performed per year	2012-2016	2017	2018	2019	Total
Re-arthroscopies pr. year (n (%))	**428** (11)	**108** (14)	**99** (12)	**107** (12)	**742** (12)

General data

At the end of 2019 there were a total of **6214 arthroscopic hip surgeries** registered in DHAR. The data presented in this annual report is a summation of all the registrations since the beginning of 2012 until Dec. 31st 2019. There are in total **6214 procedures** and **3534 Pre-PROM datasets** from patients.

Table 5. In Denmark **12** hospitals and clinics have a Regional Function (®) in hip arthroscopy. There are also 4 private clinics operating only on private insurance patients that contribute to the registry. In total **16** hospitals and clinics have reported to the DHAR.

Year	2012-2016	2017	2018	2019	Total
North Region					
Hjørring Regionshospital ®	**215**	**90**	**140**	**166**	**611**
Mid Region					
Aarhus Universitetshospital ®	**271**	**54**	**34**	**22**	**381**
Aleris Hamlet Aarhus ®	**558**	**0**	**0**	**31**	**589**
Horsens Regionshospital ®	**806**	**188**	**186**	**183**	**1363**
CAPIO Aarhus	**2**	**3**	**3**	**3**	**11**
South Region					
Odense Universitetshospital OUH ®	**408**	**80**	**63**	**47**	**598**
Privathospitalet Mølholm	**107**	**49**	**38**	**43**	**237**
Capital Region					
Aleris Hamlet København ®	**123**	**124**	**134**	**147**	**528**
AHH Amager Hvidovre Hospital ®	**280**	**62**	**62**	**73**	**477**
Bispebjerg Hospital ®	**148**	**31**	**58**	**74**	**311**
CFR Privathospitaler ®	**501**	**95**	**89**	**72**	**757**
Gildhøj Privathospital	**52**	**5**	**21**	**0**	**78**
Parkens Privathospital ®	**243**	**0**	**1**	**0**	**244**
Valdemar	**9**	**0**	**0**	**0**	**9**
Køge Sygehus®	**0**	**0**	**1**	**4**	**5**
CPH Privathospital	**0**	**0**	**0**	**15**	**15**
Total # procedures	**3723**	**781**	**830**	**880**	**6214**

Note: Not all clinics have reported from the start. This was primarily due to log-in problems

Overall data

Table 6. Demographic data

Demographics	2012-2016	2017	2018	2019	Total
Male	**1595**	**324**	**340**	**333**	**2592**
Female	**2128**	**457**	**490**	**547**	**3622**
Ratio (m/f)	**43/57**	**41/59**	**41/59**	**38/62**	**42/58**
Mean age (year)	**37.6**	**38.0**	**37.6**	**37.2**	**37.6**

Previous surgery

Table 7. Of the 6214 procedures 1281 had previous surgery in the affected hip. Among these were 357 patients, which had had a PAO (Peri-Acetabular Osteotomy) due to congenital dysplasia of the hip. Finally, 40 patients had a previous THR (Total Hip Replacement).

Previous surgery (n)	2012-2016	2017	2018	2019	Total
FAI	424	110	96	106	**736**
Loose bodies /chondromatosis	7	1	3	2	**13**
Lig. teres rupture	3	1	1	0	**5**
Infection	1	0	0	1	**2**
PAO	237	47	35	38	**357**
Osteosynthesis of SCFE	20	5	4	4	**33**
Z-plasty ITB	13	4	3	3	**23**
THR	26	7	4	3	**40**
Other	57	7	2	6	**72**
Total	788	182	148	163	**1281**

OR time

Table 8. Total OR-time (knife-time) and total traction time

OR time	2012-2016	2017	2018	2019	Total
Total OR-time (min)	**82**	**71**	**66**	**65**	**76**
Total traction time (min)	**47**	**41**	**42**	**42**	**45**

Radiology

Table 9. Radiological parameters

Radiology	2012-2016	2017	2018	2019	Total
LCE-angle (mean)	**32**	**31**	**30**	**30**	**31**
Alpha-angle (mean)	**68**	**66**	**64**	**66**	**67**
Tönnis AI-angle (mean)	**5.9**	**4.8**	**4.9**	**5.5**	**5.5**
Ischial spine sign (n (%))	**1098** (29)	**153** (20)	**148** (18)	**211** (24)	**1607** (26)
Joint Space Width (n (%))					
<2 mm.	**28** (1)	**2** (0)	**5** (0)	**1** (0)	**36** (1)
2,1-3,0 mm.	**185** (5)	**17** (2)	**21** (3)	**37** (4)	**260** (4)
3,1-4,0 mm.	**1184** (32)	**219** (28)	**253** (31)	**272** (31)	**1928** (31)
>4 mm.	**2326** (62)	**543** (70)	**547** (66)	**565** (65)	**3981** (64)

Bony work

Table 10. Relationship between rim-trimming and femoroplasty

Bony work (n (%))	2012-2016	2017	2018	2019	Total
Isolated femoroplasty	**666** (19)	**184** (25)	**164** (21)	**165** (20)	**1138** (20)
Isolated rimtrimming	**302** (9)	**102** (14)	**140** (18)	**137** (17)	**709** (12)
Comb. femoroplasty-rimtrimming	**2504** (72)	**442** (61)	**471** (61)	**519** (63)	**3936 (**68)

Labral surgery

Table 11. Labral procedures

Labral tear (n (%))	2012-2016	2017	2018	2019	Total
Yes	**3244** (87)	**670** (86)	**745** (90)	**803** (91)	**5462** (88)
No	**479** (13)	**111** (14)	**85** (10)	**77** (9)	**752** (12)
Type of surgery (n (%))	**2012-2016**	**2017**	**2018**	**2019**	**Total**
Labrum untouched (no treatment)	**5** (0)	**2** (0)	**1** (0)	**2** (0)	**10** (0)
Labral remodelling/ partial resection	**395** (12)	**80** (12)	**86** (12)	**79** (10)	**640** (12)
Labral full thickness resection	**156** (5)	**34** (5)	**41** (6)	**45** (6)	**276 (5)**
Labral repair	**2571** (79)	**532** (79)	**603** (82)	**658** (82)	**4364** (80)
Labral reconstruction	**17** (1)	**3** (0)	**2** (0)	**5** (0)	**27** (0)
Unknown	**100** (3)	**19** (3)	**12** (2)	**14** (2)	**145** (3)

Grading of cartilage lesions

Table 12. Size and grading of cartilage lesions in the acetabulum and femoral head

Cartilage lesion Acetabulum (n (%))	2012-2016	2017	2018	2019	Total
Beck Gr. 0 - Healthy	**59** (2)	**19** (3)	**12** (2)	**18** (2)	**108** (2)
Beck Gr. 1 - Fibrillation	**515** (16)	**95** (15)	**97** (13)	**113** (15)	**820** (15)
Beck Gr. 2 - Wave sign	**1318** (41)	**274** (42)	**361** (50)	**349** (47)	**2302** (43)
Beck Gr. 3 - Delamination	**945** (29)	**195** (30)	**182** (26)	**218** (29)	**1540** (29)
Beck Gr. 4 - Exposed bone	**371** (12)	**64** (10)	**67** (9)	**52** (7)	**554** (11)

Becks lesion size (n (%))	2012-2016	2017	2018	2019	Total
0	**71** (2)	**21** (3)	**12** (2)	**20** (3)	**124** (2)
Size < 1 cm^2	**942** (29)	**273** (42)	**264** (36)	**290** (39)	**1769** (33)
Size 1-2 cm^2	**1716** (53)	**276** (43)	**351** (49)	**341** (45)	**2684** (51)
Size > 2 cm^2	**479** (16)	**77** (12)	**92** (13)	**99** (13)	**747** (14)

Cartilage lesion Head (n (%))	2012-2016	2017	2018	2019	Total
ICRS Gr. 0 - Normal	**2290** (71)	**454** (70)	**484** (68)	**507** (67)	**3735** (70)
ICRS Gr. 1 - Almost normal	**281** (9)	**47** (7)	**59** (8)	**80** (11)	**467** (9)
ICRS Gr. 2 - Abnormal	**402** (13)	**86** (13)	**107** (15)	**100** (13)	**695** (13)
ICRS Gr. 3 - Severely Abnormal	**155** (5)	**37** (6)	**52** (7)	**42** (6)	**286** (5)
ICRS Gr. 4 - Exposed bone	**80** (2)	**23** (4)	**17** (2)	**21** (3)	**141** (3)

ICRS lesion size (n (%))	2012-2016	2017	2018	2019	Total
0	**2312** (72)	**456** (71)	**485** (68)	**510** (68)	**3763** (71)
Size < 1 cm^2	**286** (9)	**54** (8)	**73** (10)	**64** (9)	**477** (9)
Size 1-2 cm^2	**348** (11)	**87** (13)	**108** (15)	**107** (14)	**650** (12)
Size > 2 cm^2	**262** (8)	**50** (8)	**53** (7)	**69** (9)	**434** (8)

Cartilage surgery

Table 13. Types of cartilage treatment (most patients had a combination of treatments)

Type of cartilage surgery	2012-2016	2017	2018	2019	Total
Cartilage-resection on head	**147** (4)	**26** (3)	**18** (2)	**19** (2)	**210** (3)
Cartilage-resection in acetabulum	**1356** (39)	**181** (24)	**152** (19)	**171** (19)	**1860** (30)
Microfracture on head	**11** (0)	**4** (1)	**2** (0)	**1** (0)	**18** (0)
Microfracture in acetabulum	**165** (4)	**23** (3)	**34** (4)	**23** (3)	**245** (4)
Cartilage-refixation on head	**2** (0)	**0** (0)	**0** (0)	**1** (0)	**3** (0)
Cartilage-refixation in acetabulum	**15** (0)	**0** (0)	**3** (0)	**4** (0)	**22** (0)
Debridement with RF-wand	**1571** (42)	**504** (65)	**575** (69)	**618** (70)	**3268** (53)
Other	**75** (2)	**1** (0)	**1** (0)	**2** (0)	**79** (1)

Extraarticular surgery

Table 14. Additional extraarticular procedures

Type of extraart. proc. (n (%))	2012-2016	2017	2018	2019	Total
Partial AIIS resection	**52** (1)	**9** (1)	**8** (1)	**6** (1)	**75** (1)
Psoas-tenotomy	**241** (6)	**26** (3)	**26** (3)	**10** (1)	**303** (5)
Reinsertion of gluteus medius	**5** (0)	**0** (0)	**2** (0)	**4** (0)	**11** (0)
Z-plasty ITB	**16** (0)	**4** (1)	**1** (0)	**13** (1)	**34** (0)
Resection of trochanteric bursa	**27** (1)	**4** (1)	**4** (0)	**11** (1)	**46** (1)
Capsular closure	**426** (11)	**308** (39)	**331** (40)	**338** (38)	**1403** (23)
Remov. of hardware (AO-screws)	**37** (1)	**6** (1)	**10** (1)	7 (1)	**60** (1)
Removal of heterotop. ossification	**44** (1)	**10** (1)	**4** (0)	**2** (0)	**60** (1)
Osteosynthesis of os acetabuli	**1** (0)	**0** (0)	**1** (0)	**3** (0)	**5** (0)
Removal of os acetabuli	**25** (1)	**9** (1)	**9** (1)	**5** (1)	**48** (1)
Inforation of bone cyst	**11** (0)	**0** (0)	**5** (1)	**0** (0)	**16** (0)
Other	**56** (2)	**7** (1)	**4** (0)	**4** (0)	**71** (1)
Total	**941** (24)	**383** (48)	**405** (48)	**403** (46)	**2132** (34)

Types of complications during surgery

Table 16. Complications reported during surgery

Type of complications (n (%))	2012-2016	2017	2018	2019	Total
Labrum cut	**42** (1)	**10** (1)	**6** (1)	**3** (0)	**61** (1)
Anchor pull-out	**82** (2)	**10** (1)	**7** (1)	**10** (1)	**109** (2)
Anchor penetration acetabular surface	**31** (1)	**10** (1)	**4** 0)	**9** (1)	**54** (1)
Suture-defect (break, pull-out, etc.)	**128** (3)	**15** (2)	**21** (3)	**16** (2)	**180** (3)
Broken instrument	**38** (1)	**13** (2)	**7** (1)	**4** (0)	**62** (1)
Loss of traction	**13** (0)	**4** (1)	**5** (1)	**8** (1)	**30** (0)
"Not possible to apply traction"	**14** (0)	**11** (1)	**5** (1)	**1** (0)	**31** (0)
Other	**74** (2)	**14** (2)	**16** (2)	**12** (1)	**116** (2)
Total	**422** (11)	**87** (11)	**71** (9)	**63** (7)	**643** (10)

Antibiotic prophylaxis and DVT prophylaxis

Table 15. Use of antibiotics and DVT prophylaxis

Antibiotics (n (%))	2012-2016	2017	2018	2019	Total
Dicloxacillin	**1138** (31)	**294** (38)	**357** (43)	**340** (39)	**2129** (34)
Cefuroxim	**2402** (64)	**456** (58)	**462** (56)	**505** (57)	**3825** (62)
Total	**2798** (95)	**750** (96)	**819** (99)	**845** (96)	**5954** (96)
DVT Prophylaxis (n (%))	**2012-2016**	**2017**	**2018**	**2019**	**Total**
Dalteparin (Fragmin)	**49** (1)	**6** (1)	**3** (0)	**4** (0)	**62** (1)
Fondaparinux (Arixtra)	**1** (0)	**0** (0)	**0** (0)	**0** (0)	**1** (0)
Tinzaparin (Innohep)	**187** (5)	**1** (0)	**0** (0)	**1** (0)	**189** (3)
Rivaroxaban (Xarelto)	**675** (18)	**21** (3)	**54** (7)	**81** (9)	**831** (13)
Total	**912** (24)	**28** (4)	**57** (7)	**86** (10)	**1083** (17)

Patient Reported Outcome Measures (PROMs)

Comments to the PROMs:

The data shows a significant improvement in all PROMs but one.
The improvements in all scales are larger than the MCID (Minimal Clinical Important Difference), defined as SD/2 of the pre-operative values, except for HSAS. This exception is in accordance with the published paper on "Return to sport" [4]. The largest improvement is seen between pre-op and 1-year post-op. Table 23 shows the percentage reaching MCID. At 5 years the MCID improvement is still between 1.5 and 3.6 times the preoperative value, except for HSAS.
Regarding HAGOS the improvements are also significant for PA and QoL (Physical Activity and Quality of Life) between 1 and 2 years and between 2 and 5 years. This late improvement might be explained by a change in patients' expectations over time, as a result of accepting their hip function as it is, even if it is not at the level of a hip symptom-free control group (*Thorborg K. et al. Patient-Reported Outcomes Within the First Year After Hip Arthroscopy and Rehabilitation for Femoroacetabular Impingement and/or Labral Injury. The Difference Between Getting Better and Getting Back to Normal. Am J Sport Med 2018;46(11):2607–2614*).

Table 17. HAGOS (Copenhagen Hip and Groin Outcome Score)

PROMS pre (n=3534 (57%))	**2012-2016**	**2017**	**2018**	**2019**	**Mean (95% CI)**
HAGOS					
Pain	**50.4**	**49.6**	**48.5**	**49.6**	**49.8 (49.2 - 50.5)**
Symptoms	**48.7**	**47.2**	**46.5**	**47.8**	**48.0 (47.4 - 48.6)**
ADL	**51.9**	**51.8**	**49.0**	**52.2**	**51.4 (50.7 - 52.2)**
Sport & rec	**34.5**	**35.1**	**32.9**	**35.1**	**34.4 (33.7 - 35.2)**
PA	**20.1**	**22.8**	**21.5**	**22.6**	**21.1 (20.3 - 21.9)**
QOL	**29.1**	**29.4**	**28.3**	**29.0**	**29.0 (28.5 - 29.5)**

PROMS 1 year (n=2875 (54%))	**2012-2016**	**2017**	**2018**	**2019**	**Mean (95% CI)**
HAGOS					
Pain	**69.3**	**67.3**	**70.8**	-	**69.3 (68.4 - 70.1)**
Symptoms	**65.0**	**63.6**	**66.3**	-	**65.0 (64.2 - 65.8)**
ADL	**71.7**	**69.7**	**72.4**	-	**71.5 (70.5 - 72.4)**
Sport & rec	**56.6**	**53.4**	**58.7**	-	**56.4 (55.4 - 57.5)**
PA	**42.8**	**39.0**	**43.2**	-	**42.3 (41.1 - 43.6)**
QOL	**51.0**	**48.8**	**51.3**	-	**50.7 (49.8 - 51.7)**

PROMS 2 years (n=1948 (43%))	**2012-2016**	**2017**	**2018**	**2019**	**Mean (95% CI)**
HAGOS					
Pain	**70.5**	**69.8**	-	-	**70.4 (69.4 - 71.5)**
Symptoms	**65.6**	**65.2**	-	-	**65.6 (64.6 - 66.5)**
ADL	**72.9**	**72.7**	-	-	**72.9 (71.8 - 74.0)**
Sport & rec	**58.1**	**59.1**	-	-	**58.3 (57.0 - 59.6)**
PA	**45.5**	**49.6**	-	-	**46.2 (44.6 - 47.7)**
QOL	**53.8**	**53.6**	-	-	**53.8 (52.7 - 55.0)**

PROMS 5 years (n=604 (30%))	2012-2016	2017	2018	2019	Mean (95% CI)
HAGOS					
Pain	**72.3**	-	-	-	**72.3 (70.4 - 74.1)**
Symptoms	**66.8**	-	-	-	**66.8 (65.1 – 68.6)**
ADL	**74.1**	-	-	-	**74.1 (72.1 - 76.1)**
Sport & rec	**59.6**	-	-	-	**59.6 (57.3 - 62.0)**
PA	**45.1**	-	-	-	**50.1 (47.3 - 53.0)**
QOL	**57.1**	-	-	-	**57.1 (54.9 – 59.2)**

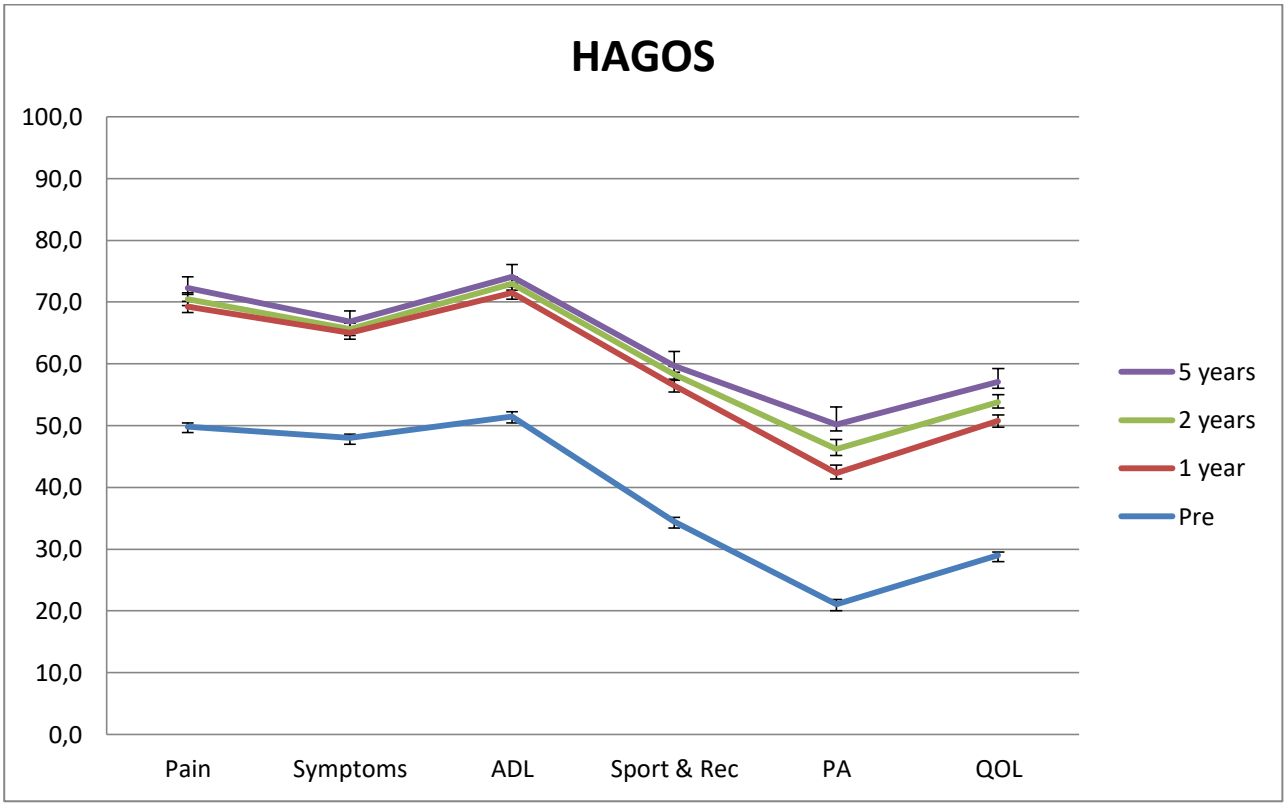


Fig. 1. HAGOS outcomes at 1, 2 and 5 years compared to the pre-scores

iHOT$_{12}$

Table 18. iHOT$_{12}$ data pre-operatively are only valid from 2019 and forward. The data from 1, 2 and 5 years have no pre-op data yet, but they will be included in the coming years

iHOT$_{12}$	2012-2016	2017	2018	2019	Mean (95% CI)
Pre (n=295)	-	-	-	**37.7**	**37.7 (36.0 – 39.3)**
1 year (n=430)	-	-	**62.9**	-	**62.9 (60.4 – 65.4)**
2 years (n=279)	-	**62.8**	-	-	**62.8 (59.6 – 65.9)**
5 years (n=295)	**66.5**	-	-	-	**66.5 (63.4 – 69.6)**

NRS scores for pain

Table 19. Numerical Rating Scale for pain at rest and after 15 minutes of walking

NRS Pain - rest	2012-2016	2017	2018	2019	Mean (95% CI)
Pre	**40.2**	**40.0**	**40.4**	**39.8**	**40.1 (39.3 – 41.0)**
1 year	**21.1**	**20.9**	**19.4**	-	**20.8 (20.0 – 21.7)**
2 years	**19.8**	**20.1**	-	-	**19.8 (18.8 – 20.8)**
5 years	**19.1**	-	-	-	**19.1 (17.4 – 20.9)**

NRS pain – walking 15 mins.	2012-2016	2017	2018	2019	Mean (95% CI)
Pre	**51.5**	**50.3**	**52.1**	**50.2**	**51.2 (50.3 – 52.1)**
1 year	**29.1**	**29.2**	**24.2**	-	**28.3 (27.3 – 29.4)**
2 years	**25.8**	**25.9**	-	-	**25.8 (24.6 – 27.0)**
5 years	**24.1**	-	-	-	**24.1 (22.0 – 26.2)**

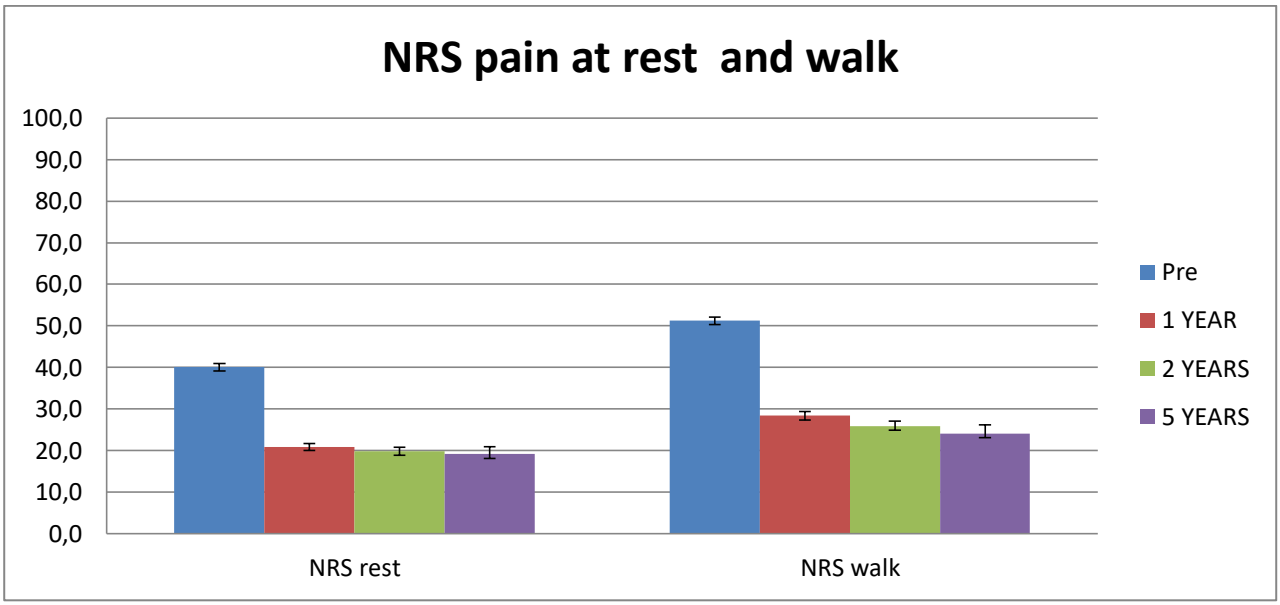


Fig. 2. NRS pain score at rest and after 15 min. walk. Outcome data at 1, 2 and 5 years compared to the pre-scores

Overall hip function

Table 20. The patient's opinion of their overall hip function. 100 is perfect without hip symptoms

VAS – overall hip function	2012-2016	2017	2018	2019	Mean (95% CI)
Pre	**41.9**	**40.6**	**39.0**	**40.6**	**41.1 (40.4 – 41.7)**
1 year	**66.1**	**65.0**	**66.9**	-	**66.1 (65.1 – 67.0)**
2 years	**67.1**	**67.3**	-	-	**67.2 (66.0 – 68.3)**
5 years	**68.8**	-	-	-	**68.8 (66.8 – 70.8)**

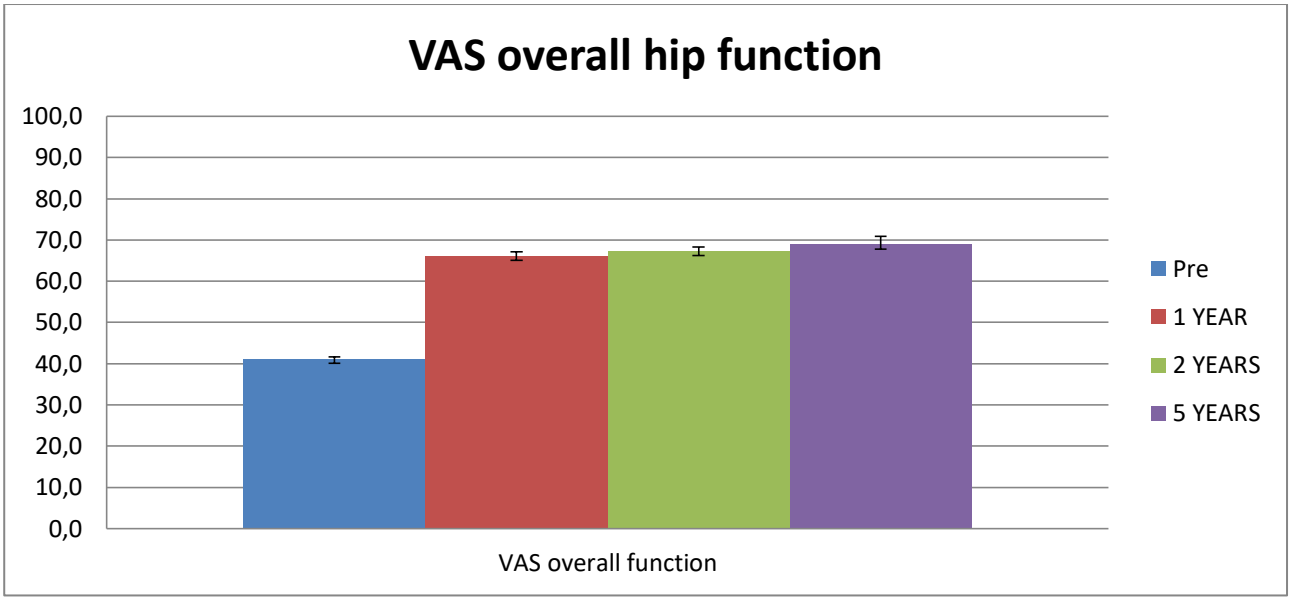


Fig. 3. VAS overall hip function outcome at 1, 2 and 5 years compared to the pre-scores

EQ5D scores

Table 21. Patient assessed general quality of life score

EQ5D	2012-2016	2017	2018	2019	Mean (95% CI)
Pre	**0.65**	**0.64**	**0.63**	**0.64**	**0.64 (0.64 - 0.65)**
1 year	**0.75**	**0.74**	**0.76**	-	**0.75 (0.74 - 0.76)**
2 years	**0.77**	**0.78**	-	-	**0.77 (0.76 - 0.78)**
5 years	**0.78**	-	-	-	**0.78 (0.77 - 0.80)**

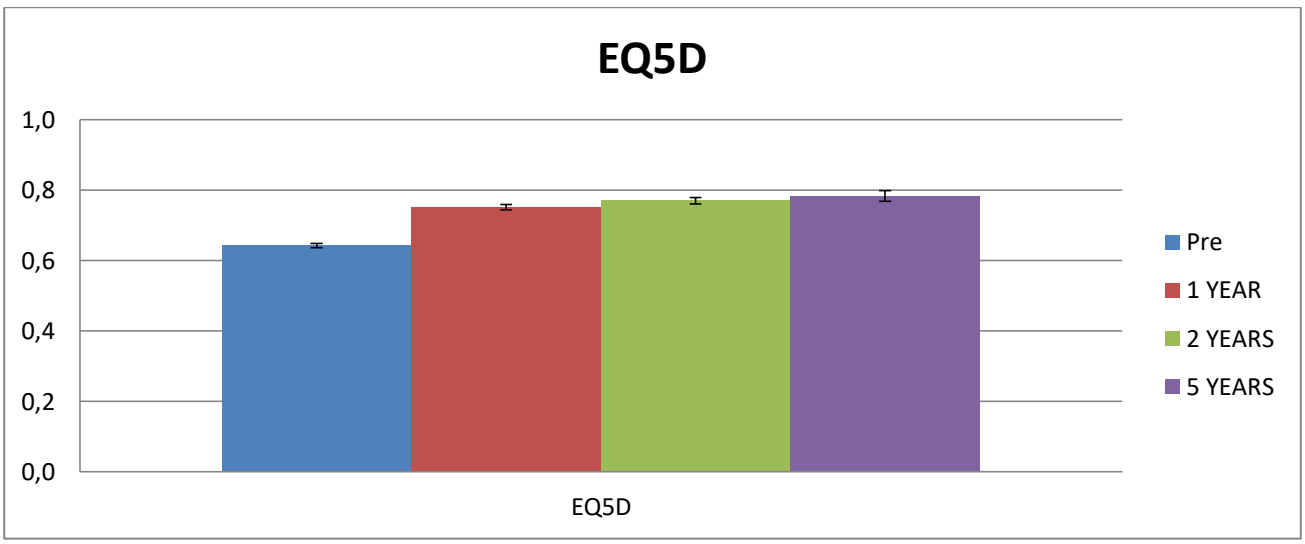


Fig. 4. EQ5D outcome data at 1, 2 and 5 years compared to the pre-scores

HSAS score (Hip Sports Activity Score)

Table 22. Patient assessed sports activity score, specific for hip related activities

HSAS	2012-2016	2017	2018	2019	Mean (95% CI)
Pre	**2.4**	**2.5**	**2.4**	**2.7**	**2.5 (2.41 - 2.54)**
1 year	**3.2**	**2.9**	**3.1**	**-**	**3.1 (3.00 - 3.26)**
2 years	**3.2**	**3.2**	**-**	**-**	**3.2 (3.11 - 3.56)**
5 years	**3.1**	**-**	**-**	**-**	**3.1 (2.92 - 3.21)**

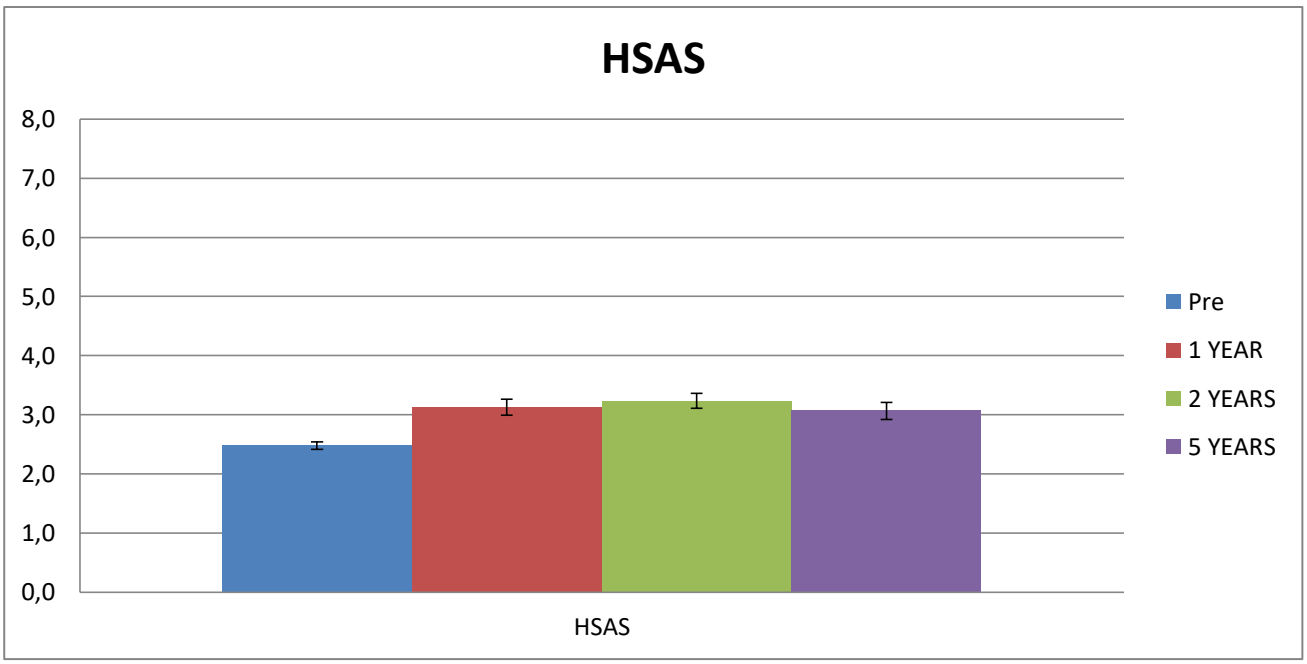


Fig. 5. HSAS outcome data at 1, 2 and 5 years compared to the pre-scores

MCID improvement

Table 23. This shows the percentage of patients that reaches the MCID (Minimal Clinical Important Difference) at follow-ups compared to baseline data

%	1 YEAR	2 YEARS	5 YEARS
HAGOS			
Pain	**66**	**69**	**69**
Symptoms	**63**	**64**	**64**
ADL	**59**	**61**	**61**
Sport & rec	**61**	**64**	**66**
PA	**59**	**64**	**66**
QOL	**67**	**72**	**76**
NRS – pain rest	**55**	**56**	**57**
NRS – pain walk	**59**	**61**	**64**
VAS – Hip function overall	**69**	**70**	**72**
EQ5D	**45**	**49**	**50**
HSAS	**41**	**43**	**45**

Table 24. This shows how many times the pre-MCID was improved at different timepoints

	Pre-MCID	1 YEAR	2 YEARS	5 YEARS
HAGOS				
Pain	**9.5**	**2.0**	**2.2**	**2.3**
Symptoms	**8.8**	**1.9**	**2.0**	**2.2**
ADL	**11.8**	**1.7**	**1.8**	**1.9**
Sport & rec	**11.4**	**1.9**	**2.1**	**2.2**
PA	**12.0**	**1.8**	**2.1**	**2.4**
QOL	**7.8**	**2.8**	**3.2**	**3.6**
NRS – pain rest	**12.6**	**1.5**	**1.6**	**1.7**
NRS – pain walk	**13.7**	**1.7**	**1.9**	**2.0**
VAS – Hip function overall	**9.6**	**2.6**	**2.7**	**2.9**
EQ5D	**0.1**	**1.2**	**1.4**	**1.6**
HSAS	**0.9**	**0.7**	**0.8**	**0.6**
iHOT$_{12}$	**9.6**			

Sub analyses on Outcome Data

HAGOS Age Related data

Comments:
Age group related PROM data demonstrated in all subjective outcomes a significant better result in the below 25 years of age group compared to the two older age groups (25-39 years and ≥40 years respectively). However, when comparing the middle age group (25-39 years) and the oldest age group (≥40 years) it is difficult to explain the lower scores in HAGOS sub scores, PA and Sport & rec. in the middle age group. Possible explanations of these findings might be due to the end of education, the beginning of a working career and family planning etc. in this middle age group, explaining the lower scores in PA and Sport & rec. The older age group is beyond this period in their life, and their expectations may therefore be reduced compared to the middle age group. [2].

Table 25. Comparison of HAGOS scores for 3 different age groups at 2 years.

Age <25 years (n=331 (38%)) (PROMS 2 years)	**2012-2015**	**2016**	**2017**	**Mean**
HAGOS				
Pain	**76.1**	**72.3**	**75.2**	**75.2 (73.1 – 77.4)**
Symptoms	**67.4**	**62.2**	**65.7**	**66.1 (64.0 - 68.3)**
ADL	**80.1**	**77.2**	**79.9**	**79.5 (77.2 – 81.9)**
Sport & rec	**64.8**	**60.7**	**64.0**	**63.9 (60.9 – 66.8)**
PA	**54.7**	**51.4**	**56.8**	**54.4 (50.6 – 58.2)**
QOL	**59.2**	**55.2**	**58.0**	**58.3 (55.5 – 61.1)**

Age 25-39 years (n=627 (42%)) (PROMS 2 years)	**2012-2015**	**2016**	**2017**	**Mean**
HAGOS				
Pain	**68.0**	**72.8**	**70.3**	**69.0 (67.2 – 70.8)**
Symptoms	**62.7**	**66.4**	**64.4**	**63.4 (61.7 – 65.2)**
ADL	**71.6**	**75.2**	**75.1**	**72.6 (70.6 – 74.6)**
Sport & rec	**54.5**	**61.3**	**63.1**	**56.7 (54.3 – 59.0)**
PA	**38.6**	**47.0**	**52.2**	**41.7 (39.0 – 44.4)**
QOL	**48.8**	**57.0**	**53.9**	**50.7 (48.6 – 52.8)**

Age ≥40 years (n=983 (46%)) (PROMS 2 years)	**2012-2015**	**2016**	**2017**	**Mean**
HAGOS				
Pain	**69.2**	**73.1**	**67.7**	**69.7 (68.2 – 71.1)**
Symptoms	**66.2**	**69.7**	**65.5**	**66.7 (65.3 – 68.0)**
ADL	**70.3**	**74.6**	**68.7**	**70.8 (69.2 – 72.5)**
Sport & rec	**56.7**	**61.7**	**55.0**	**57.3 (55.5 – 59.2)**
PA	**45.2**	**50.3**	**45.6**	**46.1 (43.9 – 48.3)**
QOL	**54.0**	**57.4**	**51.8**	**54.2 (52.6 – 55.9)**

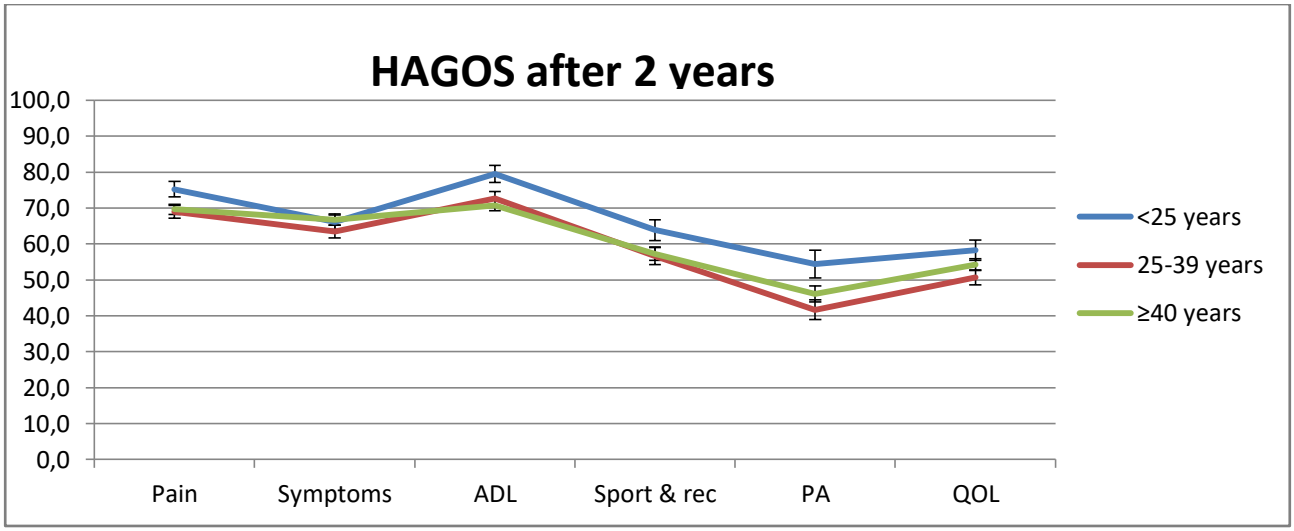


Fig. 6. HAGOS data at 2 years. Comparison of the 3 age groups

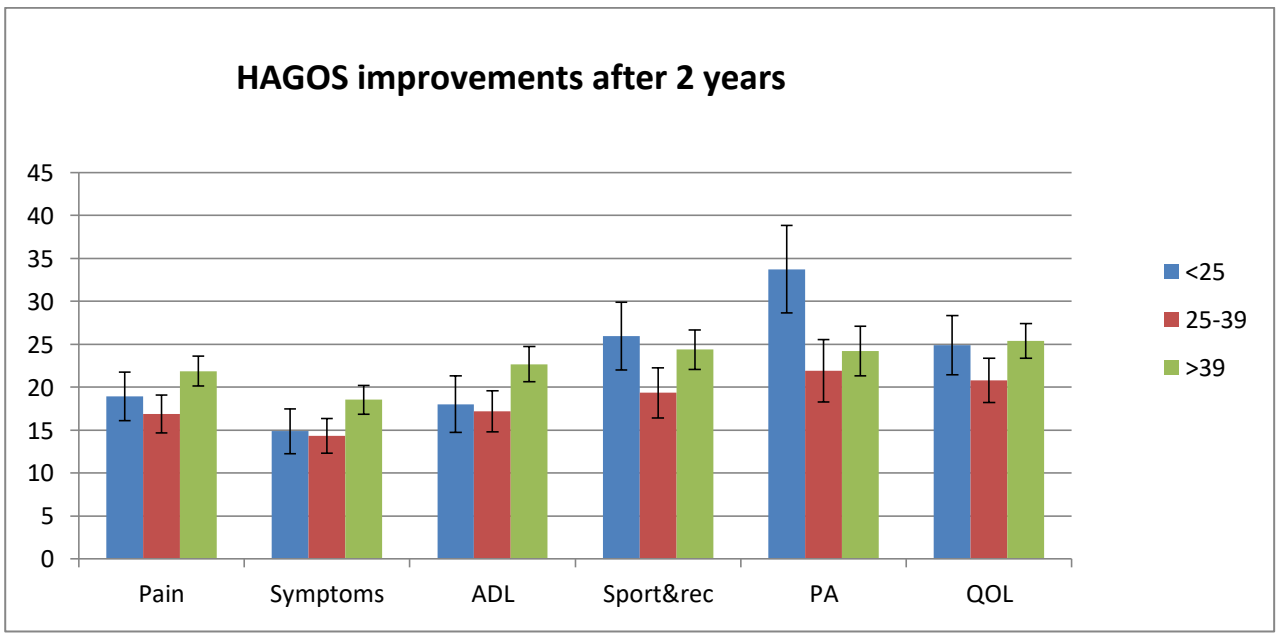


Fig. 7. The improvements in HAGOS points (0-100) from baseline to 2 years postop.

HAGOS data at 2 years related to acetabular cartilage lesions found during surgery

Comments:
The grade of acetabular cartilage lesions seen at surgery does not seem to have any influence on the HAGOS results after 2 years. The size of the lesion is not accounted for.

Table 26. Comparison of HAGOS results at 2 years between Beck grade 0-1 and grade 2-4 acetabular cartilage findings

Beck grade 0-1	2012-2015	2016	2017	Mean
HAGOS				
Pain	**70.2**	**69.0**	**65.3**	**69.3 (66.5 – 72.0)**
Symptoms	**66.0**	**64.0**	**62.8**	**65.2 (62.6 – 67.8)**
ADL	**72.6**	**74.1**	**68.1**	**72.1 (69.1 – 75.1)**
Sport & rec	**58.9**	**59.3**	**53.5**	**58.2 (54.7 – 61.6)**
PA	**50.4**	**48.0**	**43.3**	**48.9 (44.9 – 52.9)**
QOL	**56.3**	**54.2**	**49.7**	**55.0 (51.8 – 58.1)**

Beck grade 2-4	2012-2015	2016	2017	Mean
HAGOS				
Pain	**70.5**	**74.0**	**71.9**	**71.3 (70.1 – 72.4)**
Symptoms	**65.5**	**68.4**	**66.6**	**66.1 (65.0 – 67.2)**
ADL	**73.1**	**75.9**	**74.3**	**73.7 (72.4 – 75.0)**
Sport & rec	**57.7**	**61.7**	**61.1**	**58.8 (57.3 – 60.4)**
PA	**44.0**	**50.2**	**50.8**	**46.0 (44.1 – 47.8)**
QOL	**52.8**	**58.0**	**55.4**	**54.0 (52.7 – 55.4)**

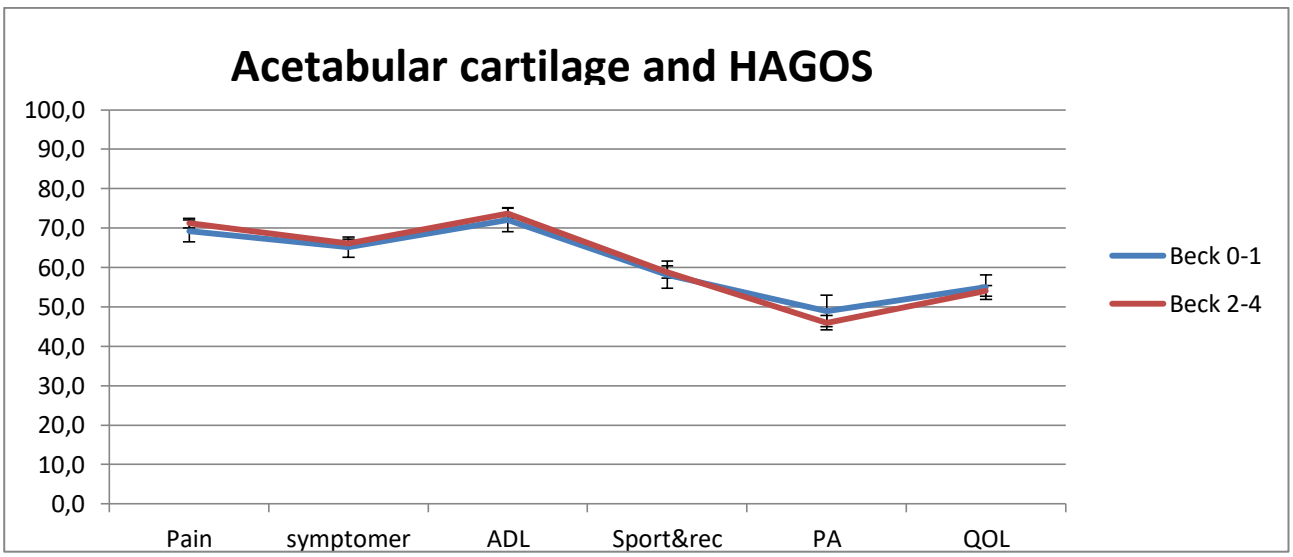


Fig. 8. HAGOS results at 2 years for Beck grade 0-1 and 2-4 acetabular cartilage status at surgery (size of lesion is not accounted for)

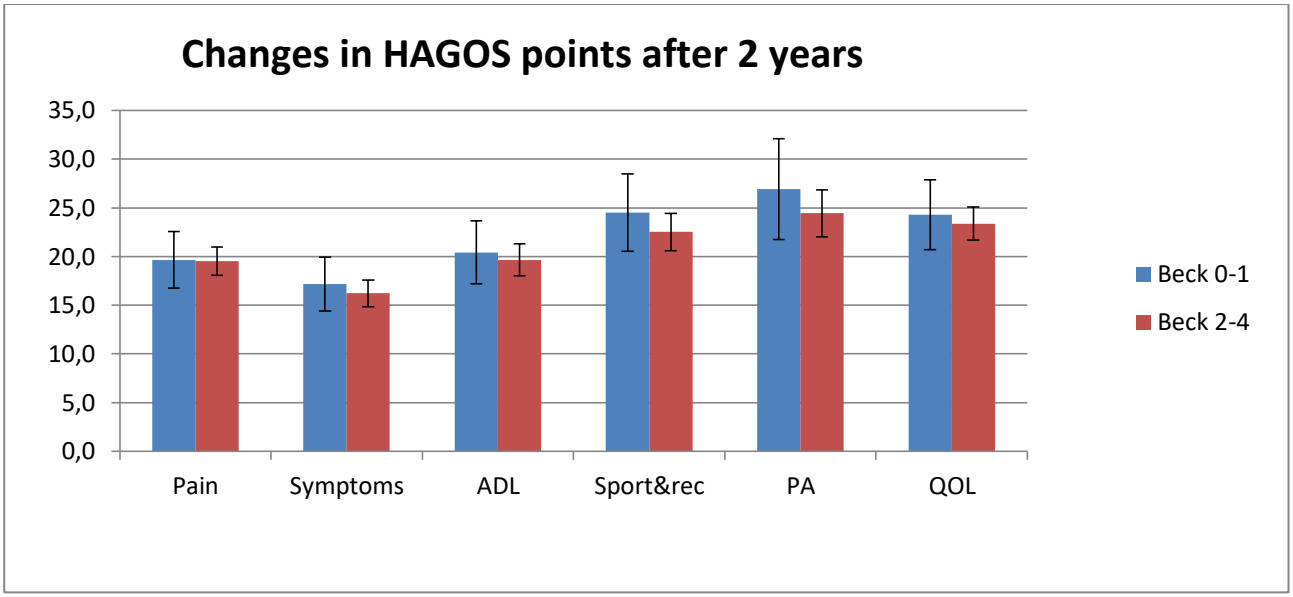


Fig. 9. Improvements in HAGOS outcome at 2 years related to the acetabular cartilage status at surgery

Re-arthroscopies

PROMs for re-arthroscopies

Comments:
These new data show the same tendency in HAGOS results as for primary hip-arthroscopies, but the results are impaired.
This would be expected, but it has not been shown before in DHAR.
The impairments seen in figure 11 are also seen in the baseline data but most pronounced in the physically demanding activities where the difference is exceeding the MCID for primary arthroscopies.

Table 27. Development of PROM results over time for re-arthroscopies and the mean results after 1, 2 and 5 years

PROMS pre (n=335 (48%))	2012-2016	2017	2018	2019	Mean (95% CI)
HAGOS					
Pain	**44.1**	**43.8**	**47.4**	**44.4**	**44.7 (42.9 – 46.6)**
Symptoms	**43.1**	**39.1**	**42.4**	**41.9**	**42.3 (40.6 – 44.0)**
ADL	**44.1**	**44.5**	**46.5**	**44.3**	**44.6 (42.3 – 46.9)**
Sport & rec	**25.8**	**23.1**	**27.9**	**25.2**	**25.8 (23.7 – 28.0)**
PA	**12.8**	**9.5**	**19.7**	**18.3**	**15.0 (12.9 – 17.1)**
QOL	**22.7**	**25.8**	**26.8**	**23.6**	**24.0 (22.5 – 25.5)**
$iHOT_{12}$	**-**	**-**	**-**	**30.5**	**30.5 (26.5 – 34.5)**
NRS Pain - rest	**47.2**	**40.6**	**43.0**	**44.5**	**45.2 (42.5 – 47.9)**
NRS pain – walking 15 mins.	**62.0**	**55.9**	**58.1**	**55.7**	**59.3 (56.5 – 62.1)**
VAS – Hip function overall	**32.7**	**36.4**	**36.0**	**34.4**	**34.0 (32.1 – 35.9)**
EQ5D	**0.57**	**0.59**	**0.62**	**0.59**	**0.58 (0.56 – 0.61)**
HSAS	**1.9**	**2.0**	**2.1**	**2.1**	**2.0 (1.83 – 2.12)**

PROMS 1 Year (n=336 (53%))	2012-2016	2017	2018	2019	Mean (95% CI)
HAGOS					
Pain	**58.0**	**57.7**	**62.8**	**-**	**58.8 (56.4 – 61.2)**
Symptoms	**54.0**	**52.9**	**58.4**	**-**	**54.6 (52.4 – 56.8)**
ADL	**60.6**	**60.5**	**61.9**	**-**	**60.8 (58.0 – 63.7)**
Sport & rec	**40.4**	**38.1**	**45.3**	**-**	**40.8 (38.0 – 43.7)**
PA	**25.5**	**24.1**	**29.5**	**-**	**26.0 (22.8 – 29.1)**
QOL	**36.2**	**36.5**	**43.9**	**-**	**37.6 (35.1 – 40.0)**
$iHOT_{12}$	**-**	**-**	**51.2**	**-**	**51.2 (44.2 – 58.1)**
NRS Pain - rest	**30.7**	**26.8**	**28.8**	**-**	**29.7 (27.0 – 32.5)**
NRS pain – walking 15 mins.	**42.4**	**39.8**	**34.3**	**-**	**40.6 (37.4 – 43.8)**

VAS – Hip function overall	**52.4**	**56.4**	**57.8**	**-**	**54.0 (51.3 – 56.7)**
EQ5D	**0.68**	**0.70**	**0.71**	**-**	**0.69 (0.67 – 0.71)**
HSAS	**2.3**	**2.4**	**2.3**	**-**	**2.3 (2.15 – 2.46)**

PROMS 2 Year (n=209 (39%))	**2012-2016**	**2017**	**2018**	**2019**	**Mean (95% CI)**
HAGOS					
Pain	**59.5**	**59.7**	**-**	**-**	**59.6 (56.4 – 62.7)**
Symptoms	**54.8**	**57.0**	**-**	**-**	**55.2 (52.2 – 58.2)**
ADL	**61.4**	**64.0**	**-**	**-**	**62.0 (58.2 – 65.7)**
Sport & rec	**42.7**	**45.8**	**-**	**-**	**43.4 (39.5 – 47.2)**
PA	**27.9**	**36.4**	**-**	**-**	**29.7 (25.4 – 33.9)**
QOL	**41.7**	**40.6**	**-**	**-**	**41.5 (38.3 – 44.7)**
$iHOT_{12}$	**-**	**51.1**	**-**	**-**	**51.1 (43.7 – 58.5)**
NRS Pain - rest	**30.6**	**25.8**	**-**	**-**	**29.6 (26.0 – 33.1)**
NRS pain – walking 15 mins.	**40.2**	**34.2**	**-**	**-**	**38.9 (34.6 – 43.3)**
VAS – Hip function overall	**54.3**	**57.8**	**-**	**-**	**55.1 (51.5 – 58.6)**
EQ5D	**0.70**	**0.72**	**-**	**-**	**0.71 (0.68 – 0.73)**
HSAS	**2.5**	**2.8**	**-**	**-**	**2.6 (2.33 – 2.79)**

PROMS 5 Year (n=50 (21%))	**2012-2016**	**2017**	**2018**	**2019**	**Mean (95% CI)**
HAGOS					
Pain	**61.7**	**-**	**-**	**-**	**61.7 (55.4 – 67.9)**
Symptoms	**57.8**	**-**	**-**	**-**	**57.8 (51.7 – 63.9)**
ADL	**65.1**	**-**	**-**	**-**	**65.1 (57.6 – 72.6)**
Sport & rec	**46.4**	**-**	**-**	**-**	**46.4 (38.6 – 54.3)**
PA	**31.3**	**-**	**-**	**-**	**31.3 (22.8 – 39.7)**
QOL	**45.5**	**-**	**-**	**-**	**45.5 (38.5 – 52.5)**
$iHOT_{12}$	**50.2**	**-**	**-**	**-**	**50.2 (39.2 – 61.2)**
NRS Pain - rest	**28.3**	**-**	**-**	**-**	**28.3 (20.9 – 46.2)**
NRS pain – walking 15 mins.	**37.7**	**-**	**-**	**-**	**37.7 (29.2 – 46.2)**
VAS – Hip function overall	**55.4**	**-**	**-**	**-**	**55.4 (47.8 – 62.9)**
EQ5D	**0.73**	**-**	**-**	**-**	**0.73 (0.68 – 0.78)**
HSAS	**2.3**	**-**	**-**	**-**	**2.3 (1.85 – 2.75)**

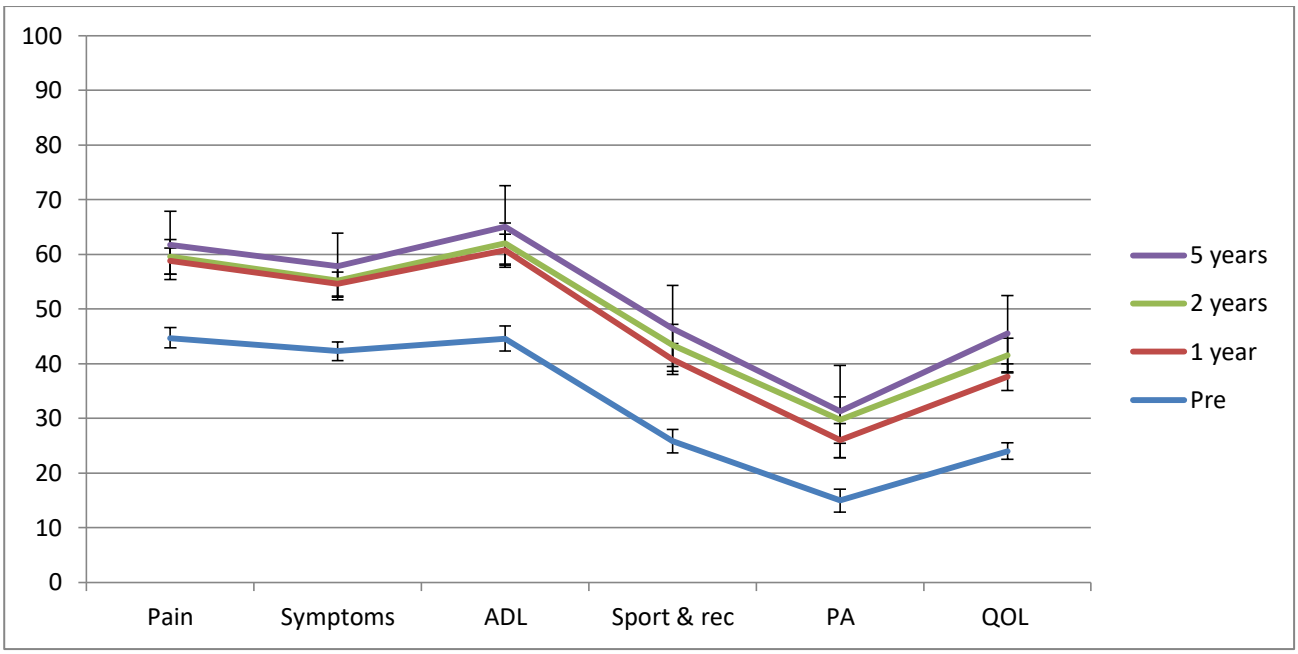


Fig. 10. HAGOS results after re-arthroscopies shows same tendencies but impaired results compared to primary hip arthroscopies

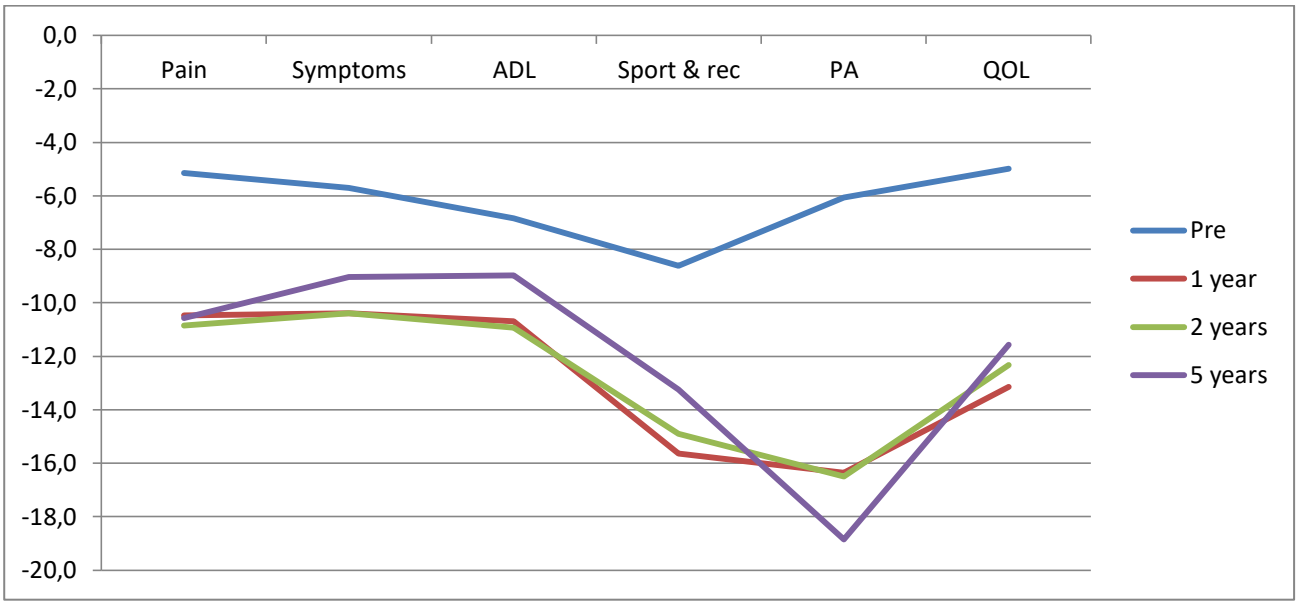


Fig. 11. Difference in mean HAGOS points between primary hip arthroscopies and re-arthroscopies. There are markedly worse HAGOS results after re-arthroscopies, especially for the physically demanding activities. 5-year results seem to improve a bit except for Physical Activity.

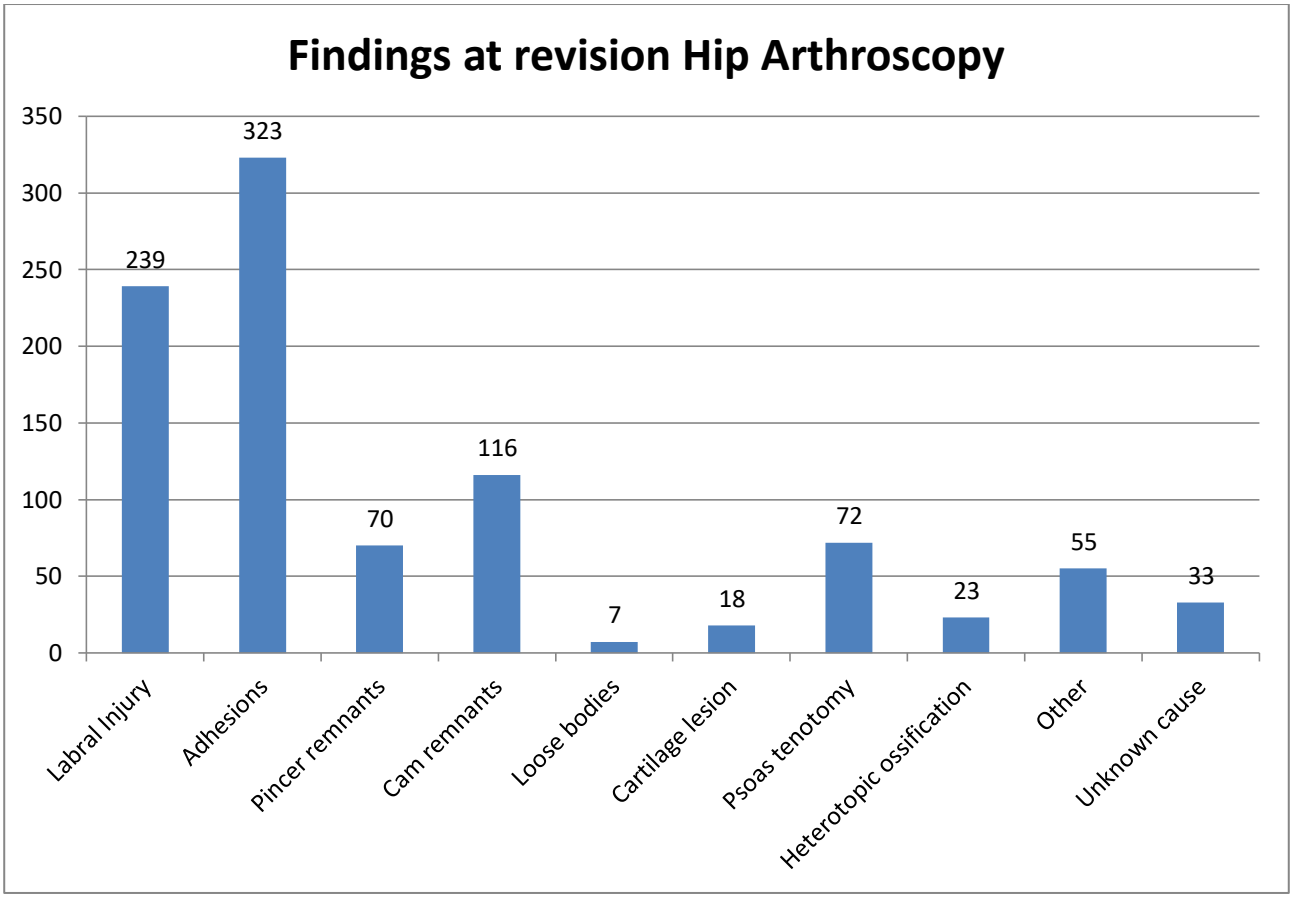


Fig. 12. Cumulated numbers of findings and procedures during re-arthroscopies.

Dansk resume

I Danmark er hofteartroskopier reguleret af Sundhedsstyrelsen via Specialeplanen for Ortopædkirurgi og er en såkaldt regionsfunktion. Dvs. kun hospitaler og klinikker med denne tildelte funktion må lave hofteartroskopier på patienter i det offentlige sundhedsvæsen. Aktuelt er der 11 hospitaler og klinikker, der har denne tilladelse.

Siden 2012 har det været muligt at indberette online til Dansk Hofte Artroskopi Register (DHAR). Aktuelt er der 16 hospitaler og privatklinikker der indberetter. Forsikringspatienter er ikke omfattet af Specialeplanen for Ortopædkirurgi, men der indberettes også fra privatklinikker, der udfører hofteartroskopier på forsikringspatienter.

Patienterne bedes om at udfylde Patient Relaterede Outcome Measures online før operationen og igen efter 1, 2, 5 og 10 år. (VAS-hoftefunktion, NRS-rest (smerte), NRS-walk (smerte), HAGOS, $iHOT_{12}$, EQ5D og HSAS score). Pga. en manglende dansk version er iHOT-12 først blevet tilgængelig fra 2019.

Ved årsskiftet 2019-2020 var der registreret i alt 6214 hofte artroskopier i DHAR. Der er ved årsskiftet registreret 3534 præoperative inklusion PROMs i registeret. Der er 3153 PROMs registreret efter 1 år og der er i alt registreret 2163 2 års PROMs i DHAR. Endvidere er der ved årsskiftet registreret 687 PROMs med et follow-up på 5 år.

DHAR Styregruppe, Torsten Grønbech Nielsen (databehandler) og Erik Poulsen (LPR-udtræk).

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English summary

In Denmark hip arthroscopies are regulated by the Danish Health Authorities and only 11 public hospitals have the permission to perform the operation on patients from the Public Healthcare System. In 2012 the Danish Hip Arthroscopy Registry was initiated, and the surgeons started to complete the forms on-line. In total 15 hospitals and clinics are reporting to the Registry. Some private clinics report to DHAR even though they are not entitled to.

The patients were asked to complete various Patient Related Outcome Measures pre-operatively (HAGOS, $iHOT_{12}$, VAS-hip function, NRS-rest (pain), NRS-walk (pain), EQ5D and the HSAS score). Both the surgeon related, and patient related registrations are web based. Due to lack of a Danish version, iHOT12 was only included from 2019.

At the end of 2019 there are included 6214 Hip Arthroscopies in the registry. There are 3534 pre-op inclusion PROMs included in this report. There are 3153 PROMs included at 1-year and there are 2163 2-year PROMs in the registry. So far, we have 687 PROMs with a 5-year follow-up.

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Publications from DHAR:

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2. Lund B, Mygind-Klavsen B, Grønbech Nielsen T *et al.* Danish Hip Arthroscopy Registry (DHAR): the outcome of patients with femoroacetabular impingement (FAI). *J Hip Preserv Surg* 2016;**3**:170–7.

3. Lund B, Nielsen TG, Lind M. Cartilage status in FAI patients – results from the Danish Hip Arthroscopy Registry (DHAR). *SICOT-J* 2017;**3**:44.

4. Ishøi L, Thorborg K, Kraemer O *et al.* Return to Sport and Performance After Hip Arthroscopy for Femoroacetabular Impingement in 18- to 30-Year-Old Athletes: A Cross-sectional Cohort Study of 189 Athletes. *Am J Sports Med* 2018;**46**:2578–87.

5. Mygind-Klavsen B, Lund B, Nielsen TG *et al.* Danish Hip Arthroscopy Registry: Predictors of Outcome in Patients with Femoroacetabular Impingement (FAI). *Knee Surg Sports Traumatol Arthrosc*. 2019 Oct; 27(10): 3110-3120.

6. Ishøi L, Thorborg K, Kraemer O *et al.* The association between specific sports activities and sport performance following hip arthroscopy for femoroacetabular impingement syndrome: A secondary analysis of a cross-sectional cohort study including 184 athletes. *J Hip Preserv Surg* 2019;**6**:124–33.

7. Ishøi L, Thorborg K, Kraemer O *et al.* Demographic and Radiographic Factors Associated With Intra-articular Hip Cartilage Injury: A Cross-sectional Study of 1511 Hip Arthroscopy Procedures. *Am J Sports Med* 2019;**47**:2617–25.