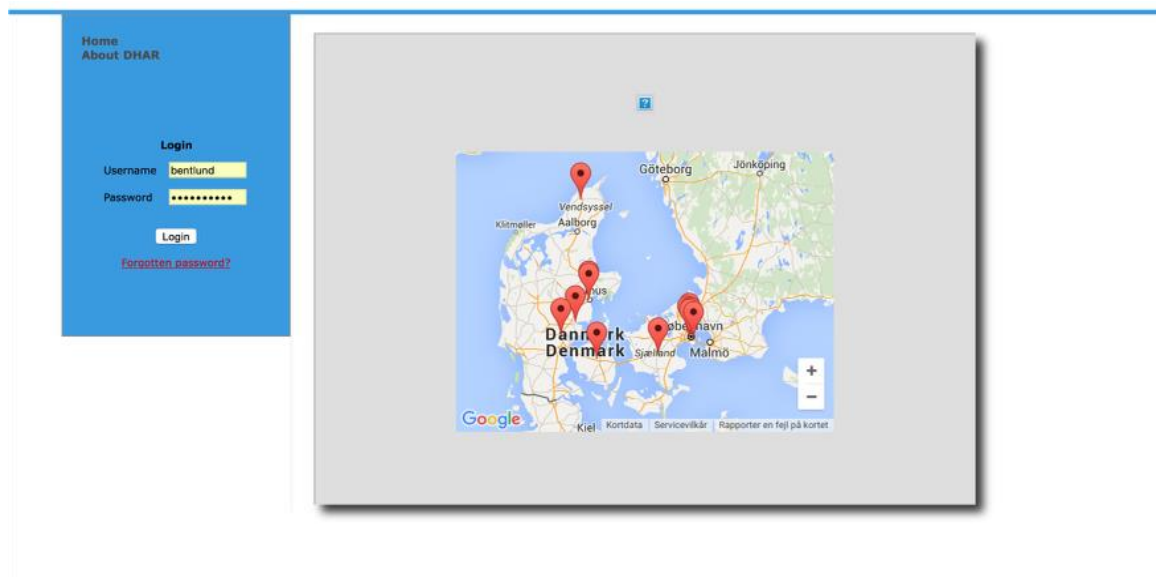


Annual report 2020

Danish Hip Arthroscopy Registry



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

Bjarne Mygind-Klavsén, Aarhus University Hospital

Table of contents

Introduction	4
About DHAR	5
Quality Indicators	6
General data	7
Demographics	8
Previous surgery	8
Radiology	9
Bony and labral procedures	10
Cartilage status and treatment	11
Extra-articular surgery	12
Surgical complications	13
Prophylaxis (antibiotics and thrombosis)	13
PROMs	14
HAGOS	14
iHOT ₁₂	17
Pain	18
Overall function	19
EQ5D	20
HSAS	21
MCID (Minimal Clinical Important Difference)	22
Age related HAGOS data	23



Cartilage lesions and HAGOS	26
Re-arthroscopies and PROMs	32
Pre-op data	31
1-year data	32
2-year data	33
5-year data	34
Re-arthroscopies compared to primary arthroscopies	36
Findings at re-arthroscopies	36
Summary in Danish and English	37
Publication list from DHAR	38



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 is one of only two national non-arthroplasty registries existing so far.

Permission was granted for the Registry in 2012 (Region Midt # 1-16-02-215-12)

Data Agreement according to the GDPR-rules was signed in 2019 (# 2012 - 1-16-02-215-12).

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 or Web meetings.

In 2016 the first full Annual report was published and since then we have published an annual report. Peer reviewed papers based on data from the DHAR will also be listed here and in fact several have already been published [1–11]. See publication list p. 38.

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.

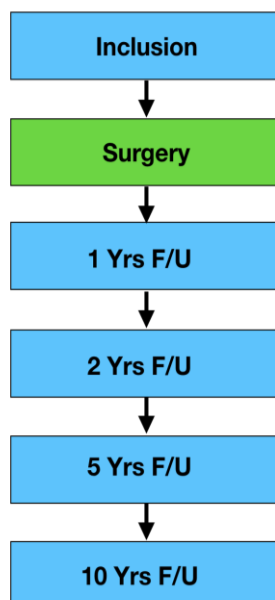
Bent Lund

Chairman of the Steering Committee.



DHAR

The Registry is based on 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 complete 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, iHOT₁₂, 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 DHAR generates an automatic e-mail notification to the patients at follow-ups 1, 2, 5 and 10 years after surgery with a link to an on-line questionnaire. If they do not respond another e-mail is automatically generated 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 have full access to the data. 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 must 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 yet available after September 2018.

Completeness of PROMS (patient)/DHAR (surgeon)

Pre-op. Target 65%

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

Completeness PROMS (n (%))	2012-2017	2018	2019	2020	Total
Pre	2343 (52)	584 (70)	608 (69)	521 (62)	4056 (58)
1 year	2419 (54)	440 (53)	445 (50)	-	3304 (53)
2 years	1936 (43)	334 (40)	-	-	2270 (43)
5 years	907 (31)	-	-	-	907 (31)

QoL improvement >25 points

1-year Target 45 %

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 (%))	2012-2017	2018	2019	2020	Total
1 year	629 (44)	163 (44)	177 (45)	-	969 (44)
2 years	564 (50)	150 (54)	-	-	714 (50)
5 years	310 (56)	-	-	-	310 (56)

Re-arthroscopies

Target 12 %

Table 4. Re-arthroscopies per year

Re-arthroscopies (n (%))	2012-2017	2018	2019	2020	Total
Re-arthroscopies pr. year (n (%))	533 (12)	98 (12)	107 (12)	103 (12)	841 (12)



General data

At the end of 2020 there were a total of **7046 arthroscopic hip surgeries** registered in DHAR. Data presented in this annual report is a summation of all the registrations since 2012 and until Dec. 31st, 2020. There are in total **7046 procedures** and **4056 Pre-PROM datasets** from patients.

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

Year	2012-2017	2018	2019	2020	Total
North Region					
Hjørring Regionshospital ®	305	140	166	89	700
Mid Region					
Aarhus Universitetshospital ®	325	34	22	32	413
Aleris Hamlet Aarhus ®	558	0	31	54	643
Horsens Regionshospital ®	994	186	183	164	1527
Capio Aarhus	5	3	3	6	17
South Region					
Odense Universitetshospital OUH ®	488	63	47	46	644
Privathospitalet Mølholm	156	38	43	52	289
Capital Region					
Aleris Hamlet København ®	247	134	147	148	676
AHH Amager Hvidovre Hospital ®	342	62	75	75	544
Bispebjerg Hospital ®	179	58	74	84	395
Capio Hellerup ®	596	89	72	18	775
Gildhøj Privathospital	57	21	0	3	81
Aleris Hamlet Parken ®	243	0	0	0	243
CPH Privathospital	0	0	15	54	69
Zealand Region					
Køge Sygehus®	0	1	4	6	11
Aleris Hamlet Ringsted	9	0	0	0	9
Total # procedures	4504	829	882	831	7046



Overall data

Table 6. Demographic data

Demographics	2012-2017	2018	2019	2020	Total
Male	1919	339	334	327	2919
Female	2585	490	548	507	4130
Ratio (m/f)	43/57	41/59	38/62	39/61	41/59
Mean age (year)	37.7	37.7	37.2	36.5	37.5

Previous surgery

Table 7. Of the 7046 procedures 1437 had a previous surgery in the affected hip. Among these were 389 patients, who were operated with a PAO (Peri-Acetabular Osteotomy) due to congenital dysplasia of the hip. Finally, 43 patients had a previous THR (Total Hip Replacement).

Previous surgery (n)	2012-2017	2018	2019	2020	Total
FAI	535	96	106	106	843
Loose bodies /chondromatosis	8	3	2	1	14
Lig. teres rupture	4	1	0	0	5
Infection	1	0	1	0	2
PAO	282	35	38	34	389
Osteosynthesis of SCFE	22	4	4	4	34
Z-plasty ITB	19	3	3	0	25
THR	32	4	5	2	43
Other	70	2	6	4	82
Total	973	148	165	151	1437

OR time

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

OR time	2012-2017	2018	2019	2020	Total
Total OR-time (min)	80	66	65	64	75
Total traction time (min)	46	42	42	42	44



Radiology

Table 9. Radiological parameters

Radiology	2012-2017	2018	2019	2020	Total
LCE-angle (Wiberg) (mean)	32	30	30	29	31
Alpha angle (mean)	69	65	66	67	68
Tönnis AI-angle (mean)	5.7	4.9	5.5	5.5	5.5
Ischial spine sign (n (%))	1251 (28)	148 (18)	212 (24)	190 (23)	1801 (26)
Lateral Joint Space Width (n (%))					
<2 mm.	30 (1)	4 (0)	1 (0)	3 (0)	38 (1)
2,1-3,0 mm.	202 (4)	21 (3)	37 (4)	21 (3)	281 (4)
3,1-4,0 mm.	1403 (31)	253 (31)	272 (31)	229 (28)	2157 (31)
>4 mm.	2869 (64)	547 (66)	567 (65)	578 (69)	4561 (64)



Bony work

Table 10. Relationship between rim-trimming and femoroplasty

Bony work (n (%))	2012-2017	2018	2019	2020	Total
Isolated femoroplasty	837 (20)	164 (21)	137 (17)	106 (13)	1244 (19)
Isolated rimtrimming	404 (10)	140 (18)	165 (20)	150 (19)	859 (13)
Comb. femoroplasty-rimtrimming	2946 (70)	471 (61)	520 (63)	537 (68)	4474 (68)

Labral surgery

Table 11. Labral findings and procedures

Labral tear (n (%))	2012-2017	2018	2019	2020	Total
Yes	3914 (87)	745 (90)	805 (91)	789 (95)	6253 (89)
No	590 (13)	84 (10)	77 (9)	45 (5)	796 (11)
Type of surgery (n (%))	2012-2017	2018	2019	2020	Total
Labrum untouched (no treatment)	7 (0)	1 (0)	2 (0)	0 (0)	10 (0)
Labral remodelling/ partial resection	475 (13)	86 (12)	79 (10)	82 (10)	722 (12)
Labral full thickness resection	190 (5)	41 (6)	45 (6)	48 (6)	324 (5)
Labral repair	3103 (79)	603 (82)	660 (82)	648 (82)	5014 (80)
Labral reconstruction	20 (1)	2 (0)	5 (0)	3 (0)	30 (0)
Unknown	119 (3)	12 (2)	14 (2)	8 (2)	153 (3)



Cartilage lesions

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

Cartilage lesion Acetabulum n (%)	2012-2017	2018	2019	2020	Total
Beck Gr. 0 – Healthy	78 (2)	12 (2)	18 (2)	16 (2)	124 (2)
Beck Gr. 1 – Fibrillation	610 (16)	97 (13)	113 (15)	121 (16)	941 (15)
Beck Gr. 2 - Wave sign	1592 (41)	361 (50)	350 (47)	347 (46)	2650 (44)
Beck Gr. 3 - Delamination	1140 (30)	182 (26)	218 (29)	202 (27)	1742 (29)
Beck Gr. 4 - Exposed bone	435 (12)	67 (9)	52 (7)	64 (9)	618 (10)

Acetabular cartilage lesion size (n (%))	2012-2017	2018	2019	2020	Total
0	92 (2)	12 (2)	20 (3)	20 (3)	144 (2)
Size < 1 cm ²	1215 (32)	264 (36)	291 (39)	308 (41)	2078 (34)
Size 1-2 cm ²	1992 (52)	351 (49)	341 (45)	333 (44)	3017 (50)
Size > 2 cm ²	556 (14)	92 (13)	99 (13)	89 (12)	836 (14)

Cartilage lesion Head (n (%))	2012-2017	2018	2019	2020	Total
ICRS Gr. 0 – Normal	2744 (71)	484 (68)	508 (67)	486 (66)	4222 (70)
ICRS Gr. 1 - Almost normal	328 (9)	59 (8)	80 (11)	85 (11)	552 (9)
ICRS Gr. 2 – Abnormal	488 (13)	107 (15)	100 (13)	108 (14)	803 (13)
ICRS Gr. 3 - Severely Abnormal	192 (5)	52 (7)	42 (6)	53 (7)	339 (5)
ICRS Gr. 4 - Exposed bone	103 (2)	17 (2)	21 (3)	18 (2)	159 (3)

Femoral head lesion size (n (%))	2012-2017	2018	2019	2020	Total
0	2768 (72)	485 (68)	511 (68)	492 (66)	4256 (71)
Size < 1 cm ²	340 (9)	73 (10)	64 (9)	73 (10)	550 (9)
Size 1-2 cm ²	435 (11)	108 (15)	107 (14)	106 (14)	756 (12)
Size > 2 cm ²	312 (8)	53 (7)	69 (9)	79 (10)	513 (8)



Cartilage surgery

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

Type of cartilage surgery	2012-2017	2018	2019	2020	Total
Cartilage-resection on head	173 (4)	18 (2)	20 (3)	28 (3)	239 (4)
Cartilage-resection in acetabulum	1537 (39)	152 (20)	171 (21)	190 (22)	2050 (32)
Microfracture on head	15 (0)	2 (0)	1 (0)	1 (0)	19 (0)
Microfracture in acetabulum	172 (4)	31 (4)	19 (2)	12 (1)	234 (4)
Cartilage-refixation on head	2 (0)	0 (0)	1 (0)	0 (0)	2 (0)
Cartilage-refixation in acetabulum	15 (0)	3 (0)	4 (0)	5 (1)	27 (0)
Debridement with RF-wand	2059 (52)	572 (73)	616 (74)	642 (73)	3889 (60)
Other	11 (0)	1 (0)	2 (0)	1 (0)	14 (0)

Extraarticular surgery

Table 14. Additional extraarticular procedures

Type of extraart. proc. (n (%))	2012-2017	2018	2019	2020	Total
Partial AIIS resection	45 (1)	6 (1)	4 (0)	5 (1)	60 (1)
Psoas-tenotomy	268 (6)	26 (3)	10 (1)	11 (1)	315 (4)
Reinsertion of gluteus medius	5 (0)	2 (0)	4 (0)	2 (0)	13 (0)
Z-plasty ITB	19 (0)	1 (0)	13 (1)	5 (1)	38 (1)
Resection of trochanteric bursa	31 (1)	4 (0)	11 (1)	4 (0)	50 (1)
Capsular closure	732 (16)	331 (40)	340 (39)	356 (43)	1759 (25)
Remov. of hardware (AO-screws)	42 (1)	10 (1)	7 (1)	8 (1)	67 (1)
Removal of heterotopic ossification	50 (1)	4 (0)	2 (0)	8 (1)	64 (1)
Osteosynthesis of os acetabuli	1 (0)	1 (0)	3 (0)	0 (0)	5 (0)
Removal of os acetabuli	32 (1)	9 (1)	5 (1)	4 (0)	50 (1)
Infection of bone cyst	7 (0)	3 (0)	0 (0)	3 (0)	13 (0)
Other	47 (1)	4 (0)	2 (0)	3 (0)	56 (1)
Total	1300 (28)	401 (48)	403 (45)	410 (49)	2514 (35)

Types of complications during surgery

Table 15. Complications reported during surgery

Type of complications (n (%))	2012-2017	2018	2019	2020	Total
Labrum cut	53 (1)	5 (1)	3 (0)	4 (0)	65 (1)
Anchor pull-out	95 (2)	7 (1)	9 (1)	11 (1)	122 (2)
Anchor penetration acetabular surface	42 (1)	4 (0)	9 (1)	3 (1)	58 (1)
Suture-defect (break, pull-out, etc.)	144 (3)	21 (3)	16 (2)	12 (2)	193 (3)
Broken instrument	42 (1)	7 (1)	4 (0)	4 (0)	57 (1)
Loss of traction	17 (0)	5 (1)	8 (1)	6 (1)	36 (0)
"Not possible to apply traction"	28 (1)	5 (1)	0 (0)	7 (1)	40 (0)
Other	90 (2)	16 (2)	12 (1)	14 (2)	132 (2)
Total	511 (11)	70 (8)	61 (7)	61 (7)	703 (10)

Antibiotic prophylaxis and DVT prophylaxis

Table 16. Use of antibiotics and DVT prophylaxis. The shift from Dicloxacillin to Cloxacillin in 2020 is due to praxis in the public healthcare medicine assortment.

Antibiotics (n (%))	2012-2017	2018	2019	2020	Total
Dicloxacillin	1432 (32)	357 (43)	342 (39)	101 (12)	2232 (32)
Cefuroxim	2858 (63)	462 (56)	505 (57)	511 (61)	4336 (62)
Cloxacillin	0 (0)	0 (0)	24 (0)	215 (26)	239 (3)
Other	3 (0)	1 (0)	0 (0)	2 (0)	6 (0)
Total	4293 (95)	820 (99)	877 (100)	829 (99)	6813 (97)
DVT Prophylaxis (n (%))	2012-2017	2018	2019	2020	Total
Dalteparin (Fragmin)	55 (1)	3 (0)	4 (0)	3 (0)	65 (1)
Fondaparinux (Arixtra)	1 (0)	0 (0)	0 (0)	0 (0)	1 (0)
Tinzaparin (Innohep)	188 (4)	0 (0)	1 (0)	2 (0)	191 (3)
Rivaroxaban (Xarelto)	697 (15)	54 (7)	81 (9)	43 (5)	875 (12)
Total	941 (21)	57 (7)	86 (10)	48 (6)	1132 (16)



Patient Reported Outcome Measures (PROMs)

Comments to the PROMs:

The data show significant improvements 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 the MCID. At 5 years the MCID improvement is still between 1.5 and 3.7 times the preoperative value, except for HSAS (Table 25). 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, because 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=4056 (58%))	2012-2017	2018	2019	2020	Mean (95% CI)
HAGOS					
Pain	50.2	48.5	49.6	48.8	49.7 (49.1 - 50.3)
Symptoms	48.4	46.5	47.8	46.7	47.8 (47.3 - 48.4)
ADL	51.9	49.0	52.3	52.1	51.5 (50.8 – 52.3)
Sport & rec	34.6	32.9	35.1	32.8	34.2 (33.5 – 34.9)
PA	20.5	21.5	22.6	18.6	20.7 (20.0 - 21.5)
QOL	29.2	28.3	28.9	28.2	28.9 (28.4 - 29.4)

PROMS 1 year (n=3304 (53%))	2012-2017	2018	2019	-	Mean (95% CI)
HAGOS					
Pain	69.0	70.9	69.8	-	69.4 (68.6 - 70.1)
Symptoms	64.8	66.4	65.3	-	65.0 (64.3 - 65.8)
ADL	71.3	72.4	73.8	-	71.8 (70.9 - 72.7)
Sport & rec	56.0	58.6	57.2	-	56.5 (55.5 - 57.5)
PA	42.0	43.2	42.8	-	42.3 (41.1 - 43.5)
QOL	50.6	51.3	50.0	-	50.6 (49.7 - 51.5)



PROMS 2 years (n=2270 (43%))	2012-2016	2017	2018	-	Mean (95% CI)
HAGOS					
Pain	70.5	69.9	70.9	-	70.5 (69.6 - 71.5)
Symptoms	65.6	65.3	66.0	-	65.6 (64.8 - 66.5)
ADL	72.9	72.7	73.2	-	73.0 (71.9 - 74.0)
Sport & rec	58.0	59.2	58.4	-	58.2 (57.0 - 59.4)
PA	45.7	49.7	47.0	-	46.4 (44.9 - 47.8)
QOL	53.9	53.6	54.6	-	54.0 (52.9 - 55.1)

PROMS 5 years (n=907 (31%))	2012-2013	2014	2015	-	Mean (95% CI)
HAGOS					
Pain	71.3	73.6	73.9	-	72.8 (71.3 - 74.3)
Symptoms	66.0	67.9	68.1	-	67.2 (65.8 - 68.6)
ADL	73.0	75.4	75.8	-	74.6 (73.0 - 76.2)
Sport & rec	58.8	61.0	60.9	-	60.2 (58.2 - 62.1)
PA	48.7	52.3	52.5	-	51.0 (48.7 - 53.4)
QOL	56.3	58.4	58.5	-	57.6 (55.9 - 59.3)

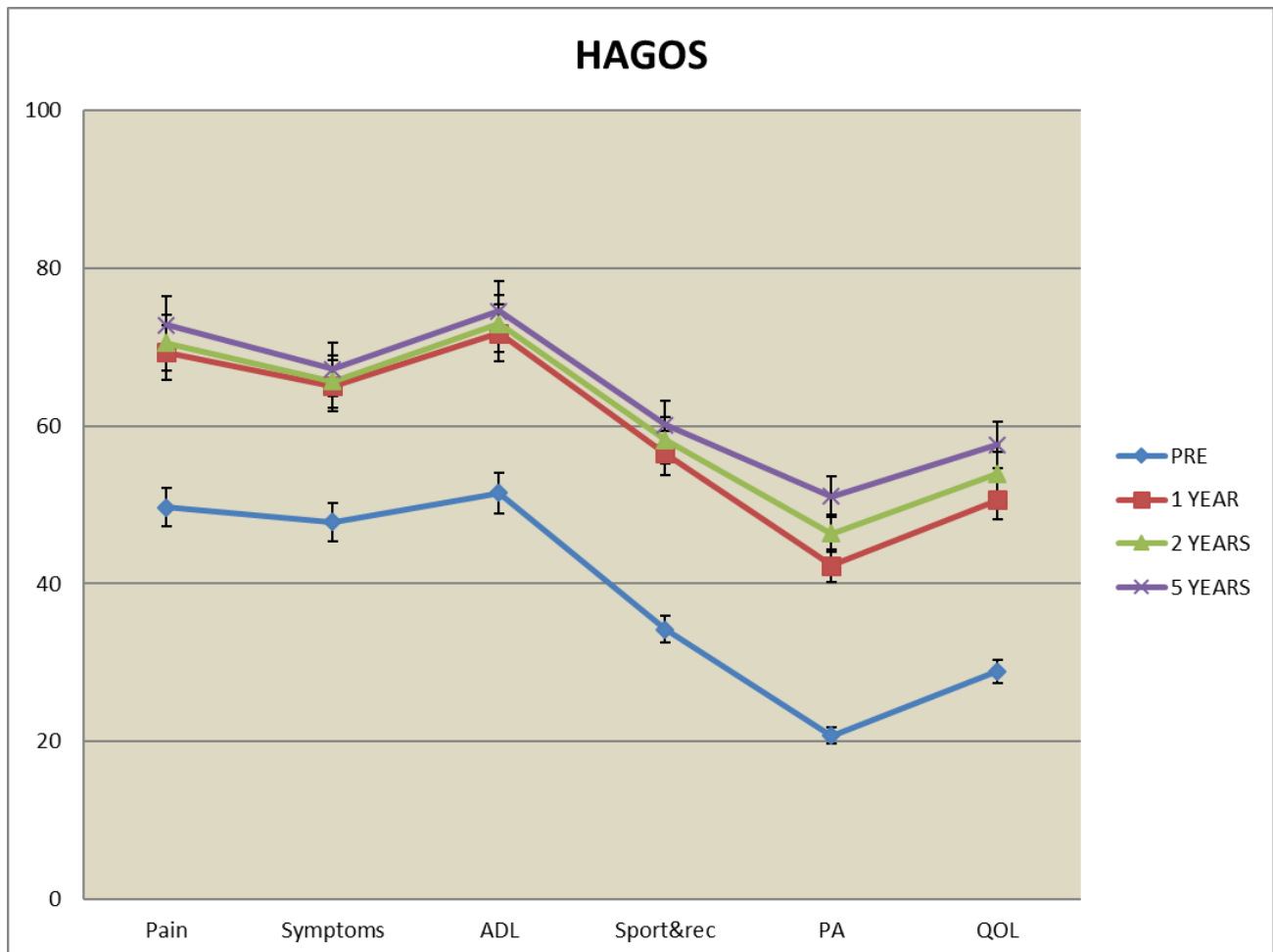


Fig. 1. HAGOS outcomes at 1, 2 and 5 years compared to the pre-scores

iHOT₁₂

Table 18. iHOT₁₂ data pre-operatively are only valid from 2019 and forward. The data from 2 and 5 years have no pre-op data yet, but they will be included in the coming years

iHOT ₁₂	2012-2017	2018	2019	2020	Mean (95% CI)
Pre (n=295)	-	-	37.7	37.1	37.4 (36.3 – 38.5)
1 year (n=430)	-	62.7	61.6	-	62.2 (60.4 – 63.9)
2 years (n=279)	63.2	64.0	-	-	63.6 (61.6 – 65.7)
5 years (n=594)	67.2	-	-	-	67.2 (65.1 – 69.4)

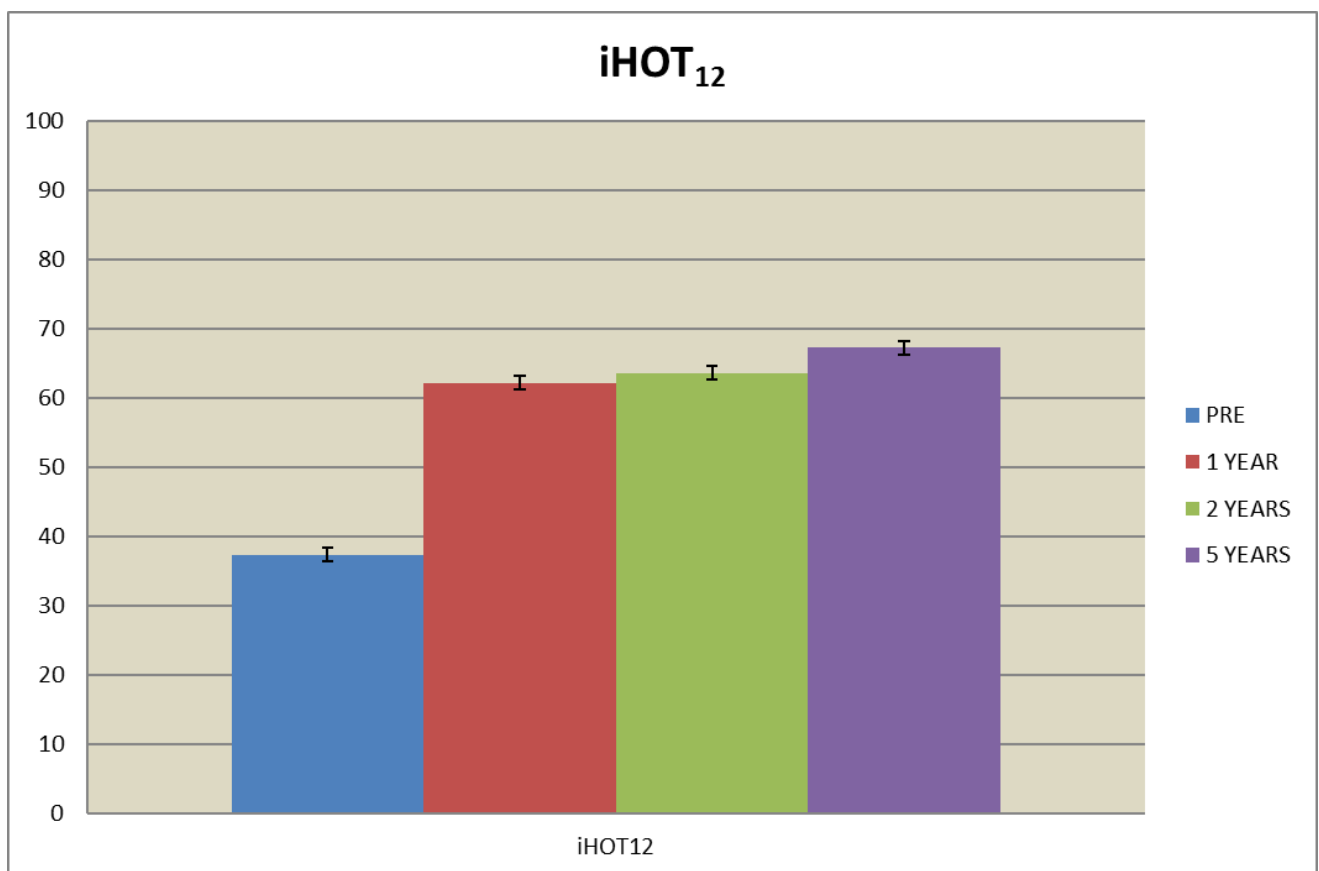


Fig. 2. iHOT₁₂ outcomes at 1, 2 and 5 years compared to the pre-scores

NRS scores for pain

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

NRS Pain - rest	2012-2017	2018	2019	2020	Mean (95% CI)
Pre	40.1	40.4	39.8	39.4	40.0 (39.3 – 40.8)
1 year	21.0	19.6	19.5	-	20.6 (19.8 – 21.4)
2 years	19.8	19.2	-	-	19.7 (18.8 – 20.7)
5 years	18.9	-	-	-	18.9 (17.5 – 20.3)

NRS pain – walking 15 mins.	2012-2017	2018	2019	2020	Mean (95% CI)
Pre	51.3	52.1	50.1	50.0	51.1 (50.2 – 51.9)
1 year	29.0	24.2	25.5	-	27.9 (26.9 – 28.9)
2 years	25.8	23.3	-	-	25.4 (24.3 – 26.5)
5 years	22.9	-	-	-	22.9 (21.2 – 24.6)

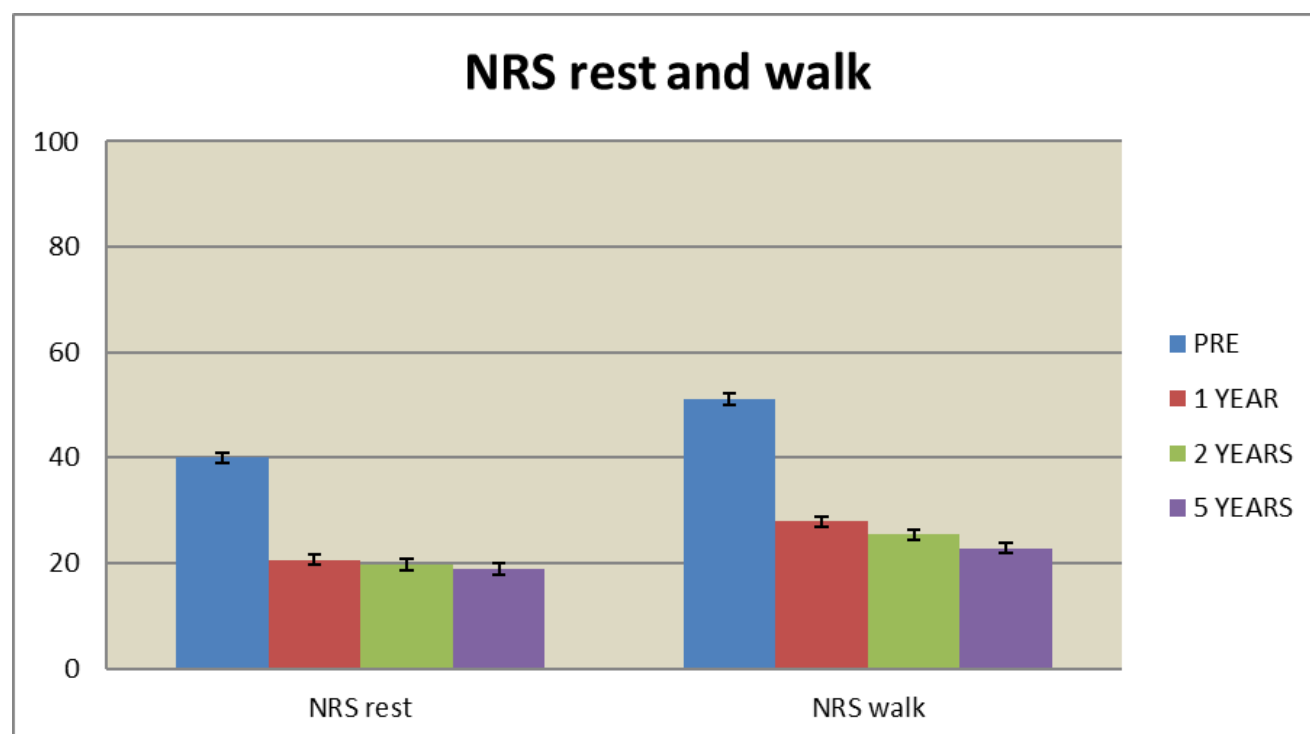


Fig. 3. NRS pain score at rest and after 15 min. walk. Outcome data at 1, 2 and 5 years compared to the pre-scores

Overall hip function

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

VAS – overall hip function	2012-2017	2018	2019	2020	Mean (95% CI)
Pre	41.7	39.0	40.6	39.3	40.8 (40.2 – 41.4)
1 year	66.0	66.6	65.5	-	66.0 (65.1 – 66.9)
2 years	67.2	66.0	-	-	67.0 (66.0 – 68.1)
5 years	69.2	-	-	-	69.2 (67.6 – 70.9)

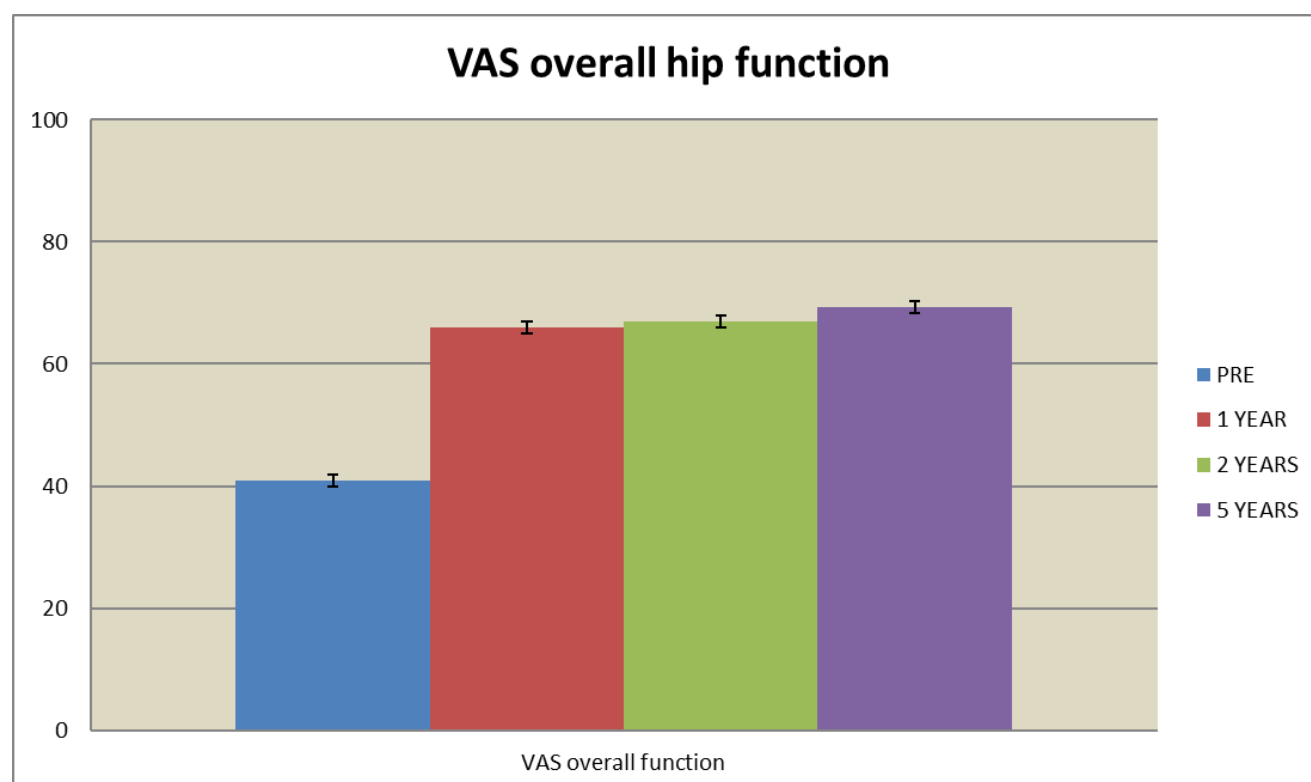


Fig. 4. VAS overall hip function outcome at 1, 2 and 5 years compared to the pre-scores

EQ5D scores

Table 21. Patient assessed general quality of life score

EQ5D	2012-2017	2018	2019	2020	Mean (95% CI)
Pre	0.65	0.63	0.64	0.63	0.64 (0.64 - 0.65)
1 year	0.75	0.76	0.75	-	0.75 (0.74 - 0.76)
2 years	0.77	0.77	-	-	0.77 (0.76 - 0.78)
5 years	0.79	-	-	-	0.79 (0.77 - 0.80)

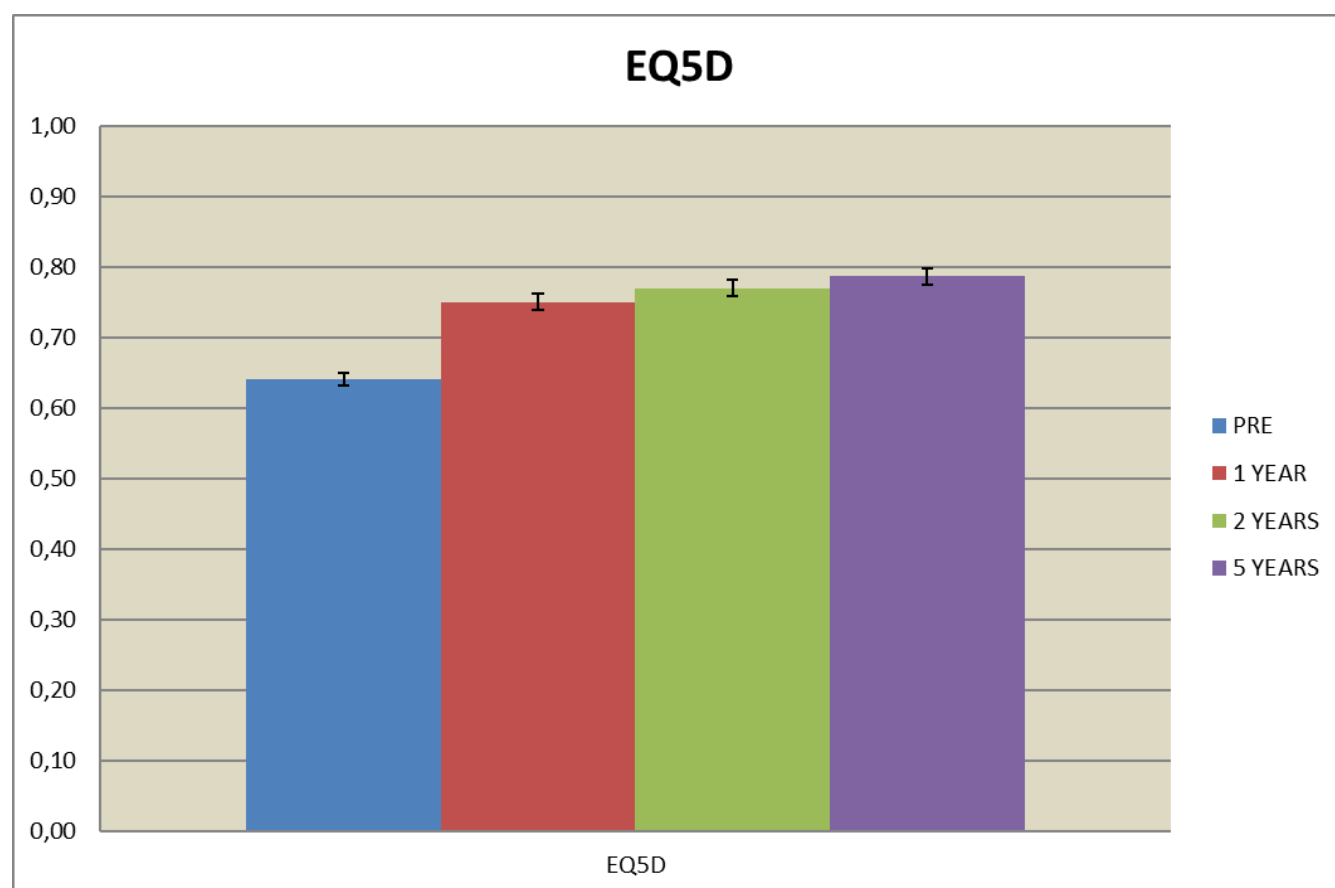


Fig. 5. EQ5D outcome data at 1, 2 and 5 years compared to the pre-scores

HSAS score (Hip Sports Activity Score)

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

HSAS	2012-2017	2018	2019	2020	Mean (95% CI)
Pre	1.5	1.4	1.7	1.6	1.5 (1.43 - 1.56)
1 year	2.0	2.1	2.0	-	2.1 (1.95 - 2.15)
2 years	2.2	2.0	-	-	2.2 (2.06 - 2.32)
5 years	2.0	-	-	-	2.0 (1.88 - 2.14)

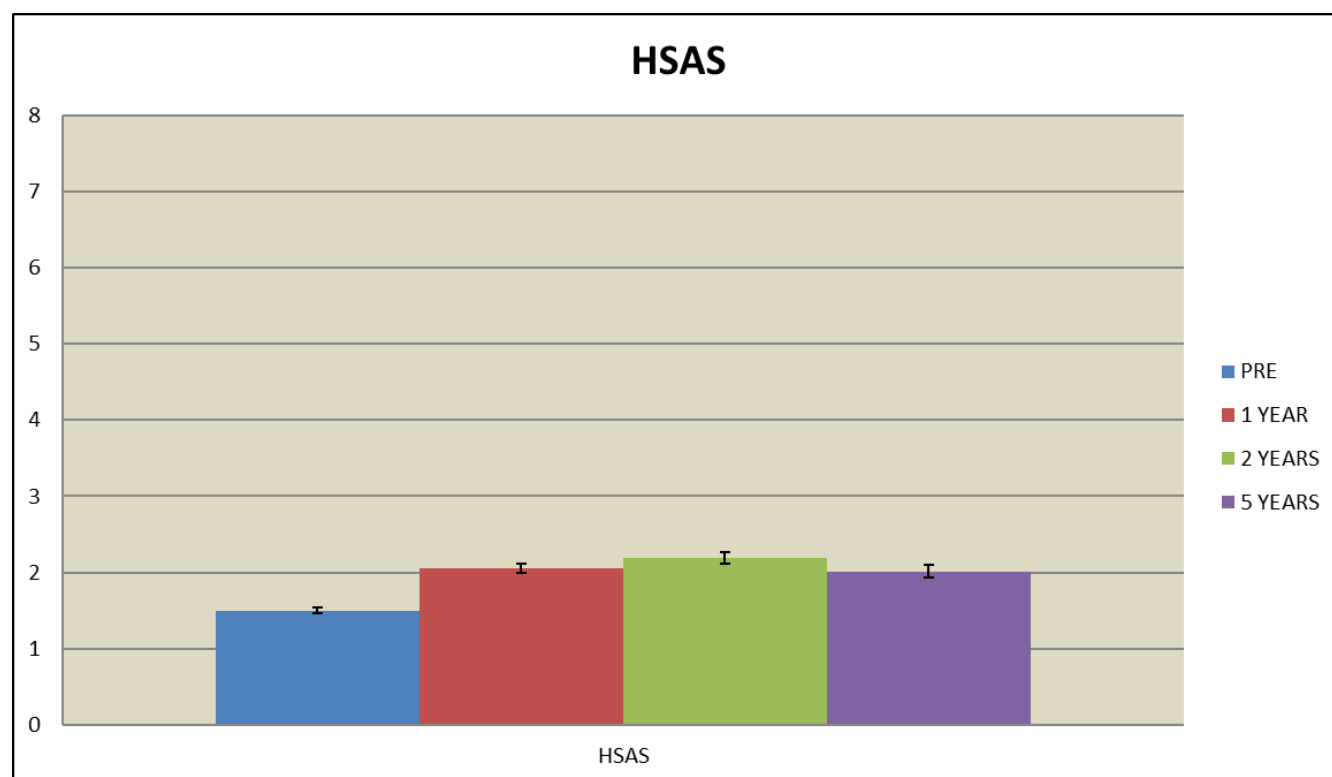


Fig. 6. HSAS outcome data at 1, 2 and 5 years compared to the pre-scores

**MCID**

Table 23. This shows the percentage of patients that reaches the Minimal Clinical Important Difference (MCID) at follow-ups compared to baseline data. MCID is calculated from baseline data (SD/2)

%	1 YEAR	2 YEARS	5 YEARS
HAGOS			
Pain	66	69	70
Symptoms	63	65	65
ADL	60	62	62
Sport & rec	62	65	67
PA	60	64	68
QOL	67	72	77
NRS – pain rest	56	57	57
NRS – pain walk	60	63	63
VAS – Hip function overall	70	70	73
EQ5D	45	49	51
HSAS	40	42	42
iHOT₁₂	70	-	-

Sub analyses on Outcome Data

HAGOS Age Related data

Comments:

Age group related PROM data demonstrated in the previous years in all subjective outcomes a significantly 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, it seems that the latest results for the young age group are impaired compared to the previous years. We have no explanation for that. We have studied the results at pre-op and 1-year PROMs of the same cohort, and all their results were between 3 and 10 points smaller than the previous years.

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 subscores PA, and Sport & rec. in the middle age group. Possible explanations of these findings might be due to the patient's conclusion of education, the beginning of a working career and family planning etc. in this middle age group. 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 24. Comparison of HAGOS scores for 3 different age groups at 2 years.

Age <25 years (n=503 (37%)) (PROMS 2 years)	2012-2016	2017	2018	Mean
HAGOS				
Pain	73.7	74.2	66.7	71.7 (69.8 – 73.5)
Symptoms	64.5	64.7	60.7	63.4 (61.6 – 65.2)
ADL	78.2	79.0	72.5	76.6 (74.6 – 78.7)
Sport & rec	62.2	63.1	52.3	59.4 (57.0 – 61.8)
PA	52.3	55.4	40.8	49.3 (46.2 – 52.4)
QOL	56.1	55.7	48.9	53.9 (51.7 – 56.2)

Age 25-39 years (n=744 (41%)) (PROMS 2 years)	2012-2016	2017	2018	Mean
HAGOS				
Pain	68.9	69.9	72.8	69.6 (67.9 – 71.2)
Symptoms	63.4	64.4	65.0	63.8 (62.2 – 65.3)
ADL	72.1	74.6	75.6	72.9 (71.1 – 74.7)
Sport & rec	55.8	62.9	59.6	57.2 (55.1 – 59.3)
PA	40.3	52.9	47.3	42.8 (40.3 – 45.3)
QOL	50.4	54.0	55.8	51.6 (49.7 – 53.5)



Age ≥ 40 years (n=1112 (45%)) (PROMS 2 years)	2012-2016	2017	2018	Mean
HAGOS				
Pain	70.2	67.8	71.6	70.1 (68.8 – 71.5)
Symptoms	67.1	65.7	68.6	67.1 (65.9 – 68.4)
ADL	71.4	68.8	72.2	71.2 (69.7 – 72.7)
Sport & rec	57.6	54.7	60.2	57.6 (55.9 – 59.4)
PA	46.7	45.1	49.5	46.9 (44.9 – 49.0)
QOL	55.0	51.9	56.2	54.8 (53.3 – 56.3)

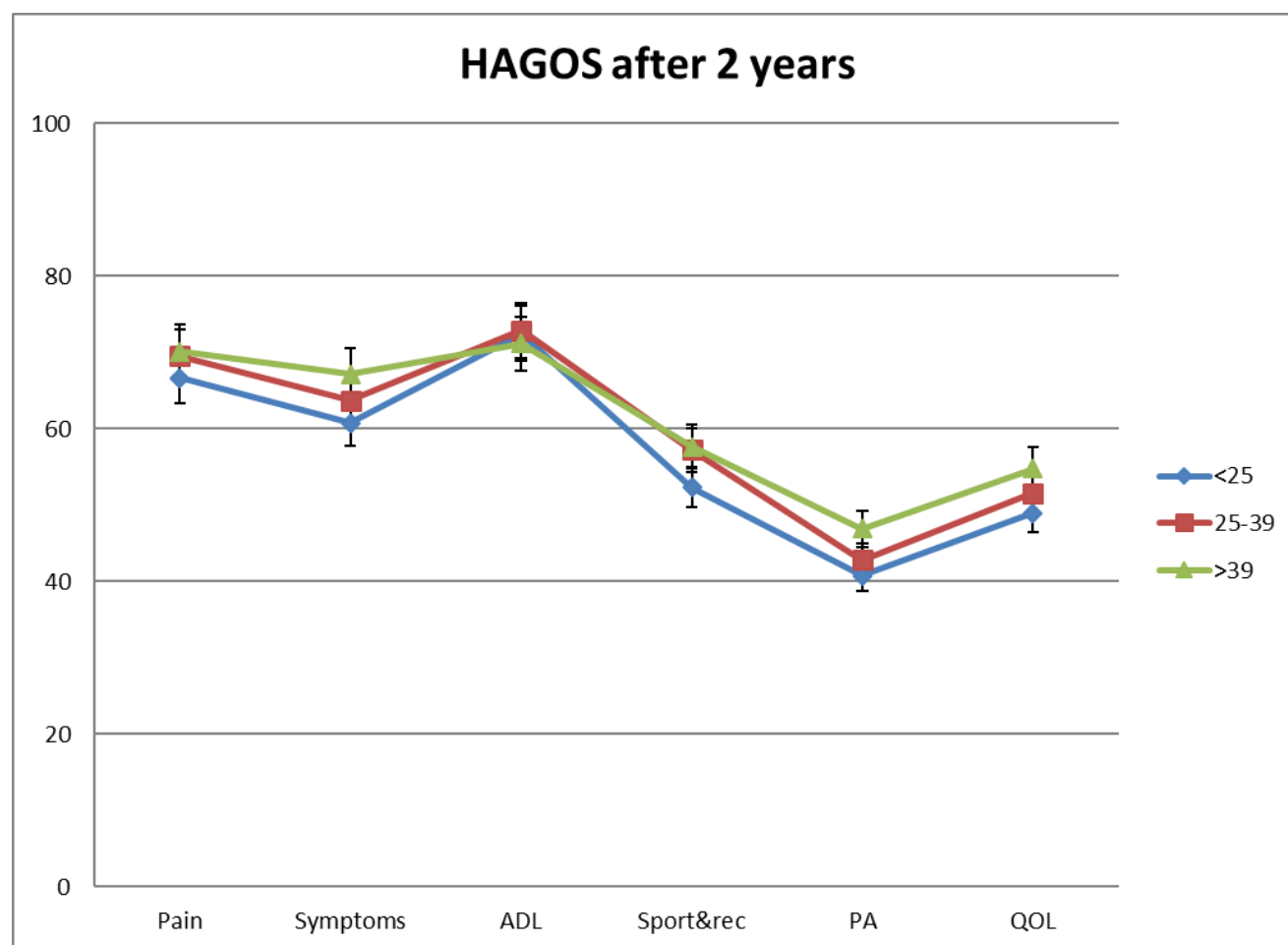


Fig. 7. HAGOS data at 2 years. Comparison of the 3 age groups

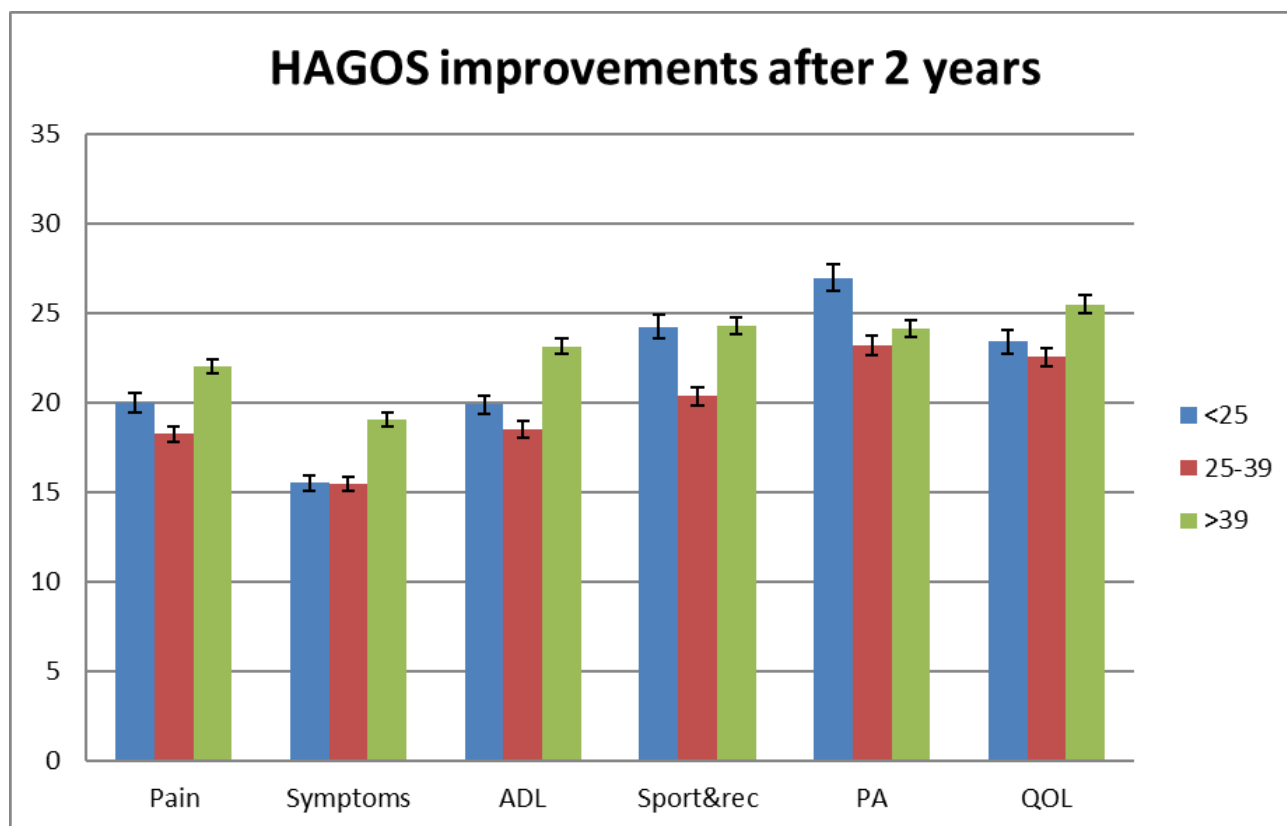


Fig. 8. The improvements in HAGOS points (0-100) from baseline to 2 years postop.

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

Comments:

Because of the small numbers in some of the groups it is not possible to make reliable diagrams that shows combinations of all the different sizes and grades of cartilage lesions. Therefore, we show two simplified diagrams that shows the important tendencies. The grade of acetabular cartilage lesions seen at surgery seems only to be of significance for the large size lesions in the acetabulum on the HAGOS results after 2 years. The size alone seems also to be of significance, since the large size lesions ($>2\text{ cm}^2$) have worse results than all the others, and there is no difference between the small and middle size lesions.

The size of the lesions on the femoral head does not have much significance since any size lesions have impaired results but worse results are seen for the large lesions in the physically demanding items in HAGOS.

Table 25. Comparisons of HAGOS and different grades and sizes of cartilage lesions I the acetabulum.

Beck gr. 2 / 1-2cm ² (n=456 (42%))	2012-2016	2017	2018	Mean
HAGOS	(n=351)	(n=45)	(n=60)	
Pain	72.6	66.6	68.6	71.6 (69.2 – 74.0)
Symptoms	67.3	63.3	63.2	66.4 (64.1– 68.6)
ADL	74.8	70.7	71.1	73.9 (71.3 – 76.6)
Sport & rec	62.1	57.3	57.0	60.9 (57.9 – 64.0)
PA	48.0	51.1	48.3	48.4 (44.8 – 52.0)
QOL	56.0	54.1	52.9	55.4 (52.7 – 58.1)

Beck gr. 2 / $>2\text{ cm}^2$ (n=28 (29%))	2012-2016	2017	2018	Mean
HAGOS	(n=17)	(n=2)	(n=9)	
Pain	63.5	66.3	70.3	65.9 (54.1 – 77.6)
Symptoms	60.3	53.6	61.1	60.1 (49.8 – 70.3)
ADL	60.6	65.0	68.9	63.6 (51.3 – 75.9)
Sport & rec	48.9	57.8	49.3	49.7 (34.4 – 64.9)
PA	44.9	50.0	41.7	44.2 (27.2 – 61.2)
QOL	49.1	57.5	53.3	51.1 (40.1 – 62.0)



Beck gr. 3 / 1-2cm ² (n=325 (42%))	2012-2016	2017	2018	Mean
HAGOS	(n=251)	(n=34)	(n=40)	
Pain	72.3	75.4	72.3	72.6 (69.9 – 75.3)
Symptoms	68.0	69.4	64.5	67.7 (65.2 – 70.3)
ADL	74.8	78.5	72.1	74.8 (71.7 – 77.9)
Sport & rec	59.1	65.3	58.5	59.7 (56.2 – 63.1)
PA	47.1	54.0	47.8	47.9 (43.5 – 52.4)
QOL	55.8	56.9	56.1	55.9 (52.7 – 59.1)

Beck gr. 3 / >2cm ² (n=80 (44%))	2012-2016	2017	2018	Mean
HAGOS	(n=51)	(n=12)	(n=17)	
Pain	68.0	70.2	74.4	68.9 (63.4 – 74.4)
Symptoms	62.4	62.5	67.9	63.6 (58.1 – 69.1)
ADL	70.1	72.1	73.5	70.1 (64.1 – 76.1)
Sport & rec	50.0	55.2	55.9	51.6 (44.2 – 59.1)
PA	44.3	50.0	34.6	41.3 (32.3 – 50.2)
QOL	49.3	52.5	55.0	49.9 (43.6 – 56.2)

Beck gr. 4 / 1-2cm ² (n=90 (44%))	2012-2016	2017	2018	Mean
HAGOS	(n=74)	(n=6)	(n=10)	
Pain	68.3	82.5	79.3	70.4 (65.0 – 75.8)
Symptoms	62.3	79.2	75.7	64.9 (59.4 – 70.3)
ADL	72.4	81.7	83.0	74.2 (68.3 – 80.2)
Sport & rec	51.9	68.2	69.4	54.9 (48.1 – 61.8)
PA	38.7	62.5	58.8	42.5 (33.9 – 51.1)
QOL	49.2	70.0	64.0	52.2 (45.8 – 58.7)



Beck gr. 4 / >2cm ² (n=99 (40%))	2012-2016	2017	2018	Mean
HAGOS	(n=75)	(n=12)	(n=12)	
Pain	67.6	66.0	68.1	67.4 (62.7 – 72.2)
Symptoms	60.3	60.4	65.2	60.9 (56.4 – 65.4)
ADL	68.5	69.6	68.3	68.6 (63.4 – 73.9)
Sport & rec	45.9	51.3	59.6	48.2 (41.7 – 54.7)
PA	36.2	37.5	34.4	36.1 (28.4 – 43.8)
QOL	46.9	43.8	48.3	46.7 (41.2 – 52.2)

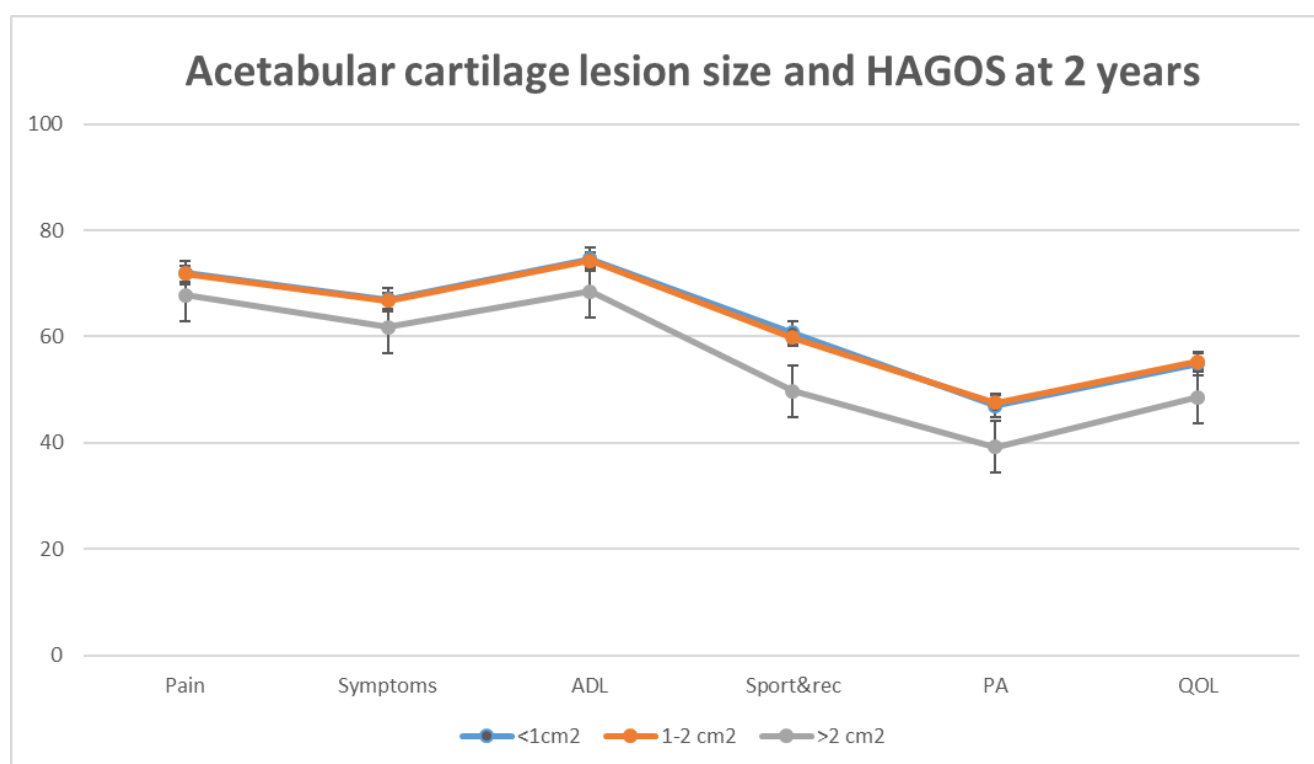


Fig. 9. HAGOS results for Beck grade 2-4 cartilage lesions. Only the large size lesion seems to affect the results.

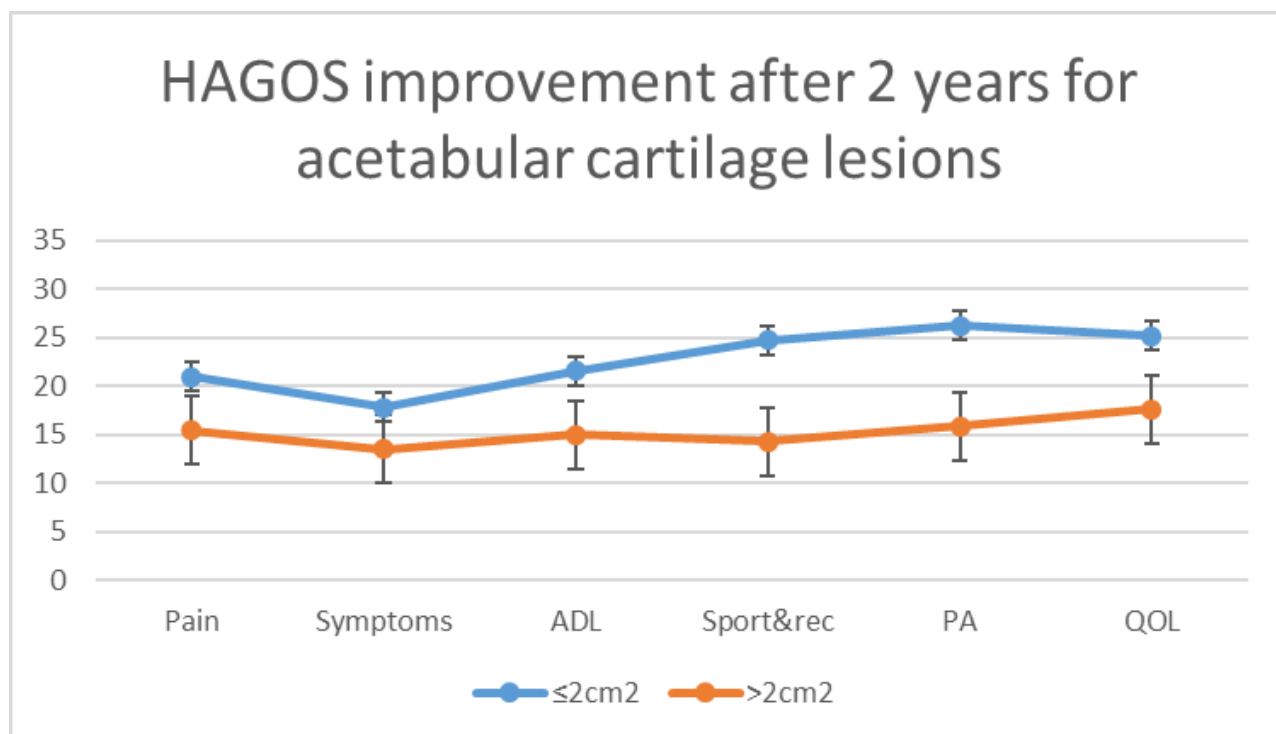


Fig. 10. Difference in HAGOS improvements at 2 years between large and smaller size cartilage lesions in the acetabulum irrespective of the grade. Only the large size lesions seem to differ from the others, and for simplicity all the smaller sizes have been pooled to one line.

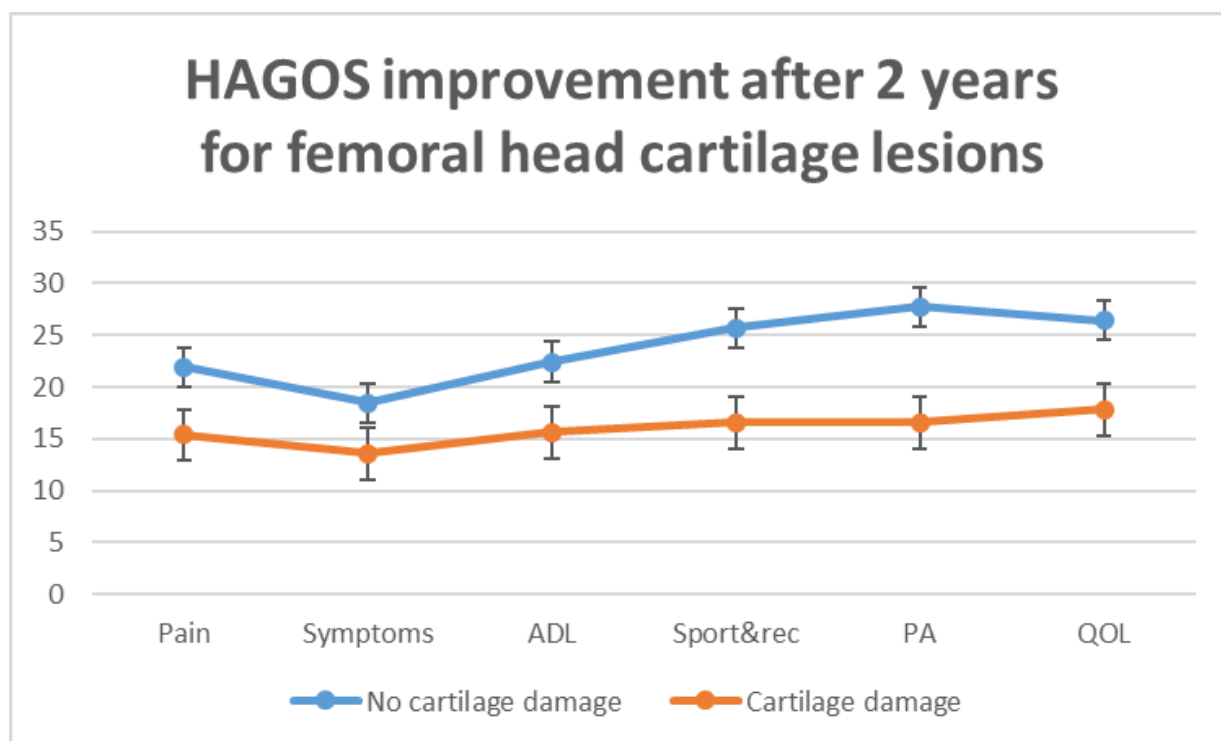


Fig. 11. Difference in HAGOS improvements at 2 years between any size cartilage lesion and no cartilage lesion at all on the femoral head irrespective of the grade. Any cartilage lesion size on the femoral head seem to differ from no lesion.

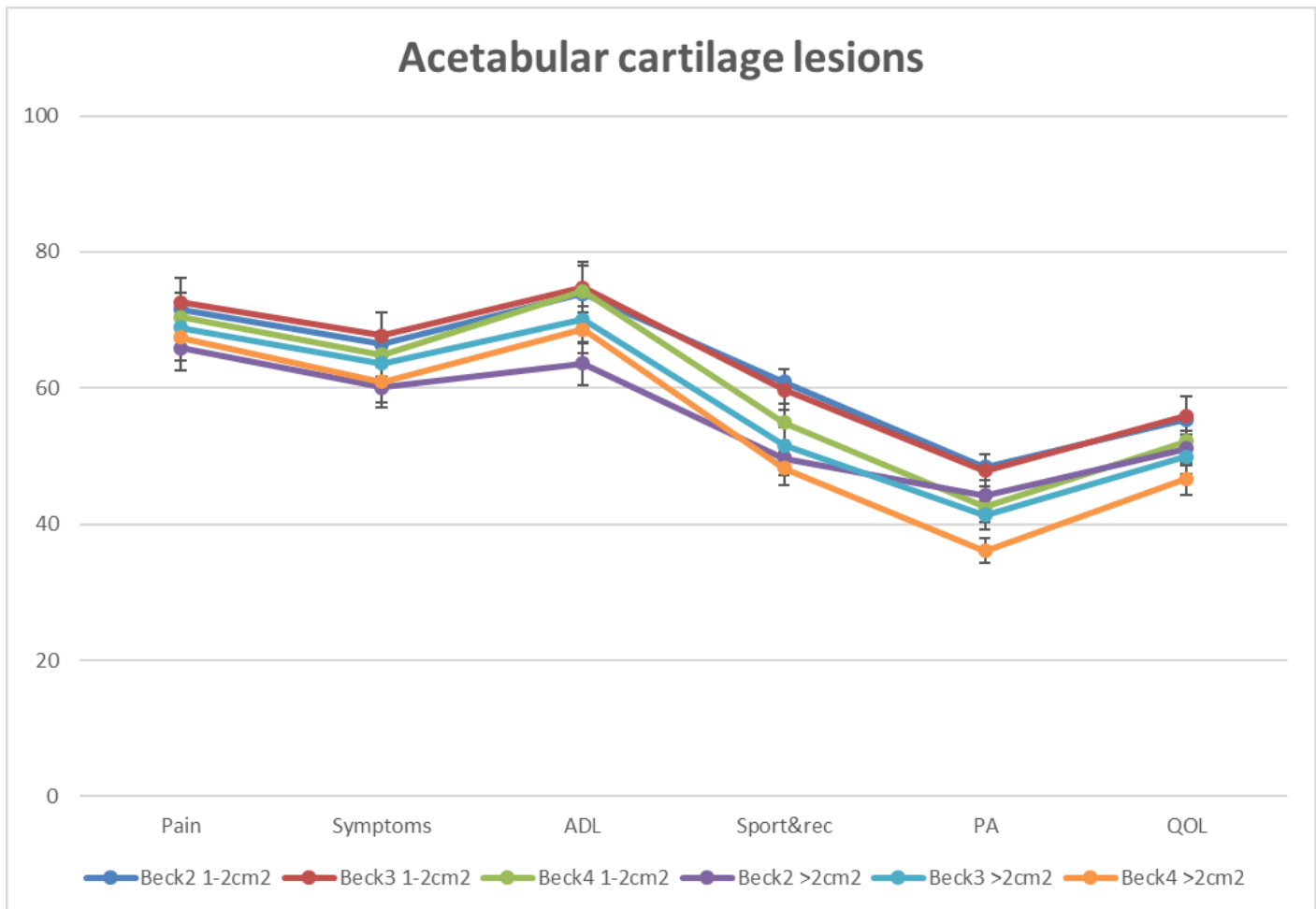


Fig. 12. The medium size grade 2 and 3 lesions have better results than all the large size lesions and the medium size grade 4 lesions. The worst results are seen in the large grade 4 lesions.



Revision arthroscopies

PROMs for revision arthroscopies

Comments:

These data show the same improvement tendencies in HAGOS results as for primary hip-arthroscopies, but the improvements are smaller (figure 11). This would be expected, but it has not been shown previously in DHAR.

The negative results seen in figure 12 shows, that the results after re-arthroscopies are less good than after primary arthroscopies. This is most pronounced in the physically demanding activities where the difference is exceeding the MCID for primary arthroscopies. At 5 year there seems to be a markedly improvement in the non-physical activities, but the results are still at a lower level than after primary hip arthroscopies.

Table 26. Development of PROM results over time for revision arthroscopies and the mean results after 1, 2 and 5 years

PROMS pre (n=416 (48%))	2012-2017	2018	2019	2020	Mean (95% CI)
HAGOS					
Pain	44.1	47.4	44.4	45.9	44.9 (43.3 – 46.6)
Symptoms	42.3	42.4	41.9	43.2	42.4 (40.8 – 43.9)
ADL	44.1	46.6	44.3	51.3	45.6 (43.4 – 47.7)
Sport & rec	25.3	27.7	25.2	26.7	25.8 (23.9 – 27.8)
PA	12.3	19.6	18.3	13.8	14.8 (12.9 – 16.7)
QOL	23.2	26.6	23.6	26.0	24.2 (22.9 – 25.6)
iHOT ₁₂	-	-	30.5	35.5	32.7 (29.7 – 35.7)
NRS Pain - rest	46.2	43.1	44.5	37.7	44.2 (41.8 – 46.6)
NRS pain – walking 15 mins.	61.1	58.2	55.7	52.8	58.4 (55.9 – 60.9)
VAS – Hip function overall	33.3	35.7	34.4	37.1	34.4 (32.7 – 36.2)
EQ5D	0.57	0.62	0.59	0.64	0.59 (0.57 – 0.61)
HSAS	1.9	2.1	2.1	2.3	2.0 (1.87 – 2.14)



PROMS 1 Year (n=397 (53%))	2012-2017	2018	2019	2020	Mean (95% CI)
HAGOS					
Pain	58.2	63.2	66.6	-	60.1 (57.9 – 62.4)
Symptoms	53.9	58.9	62.1	-	55.9 (53.8 – 57.9)
ADL	60.8	62.4	70.3	-	62.4 (59.8 – 65.0)
Sport & rec	40.2	46.0	50.9	-	42.6 (39.9 – 45.3)
PA	25.4	29.4	35.8	-	27.6 (24.6 – 30.5)
QOL	36.4	44.1	44.1	-	38.7 (36.4 – 41.0)
iHOT ₁₂	-	51.8	58.5	-	55.1 (50.1 – 60.1)
NRS Pain - rest	29.7	28.6	20.1	-	28.1 (25.7 – 30.6)
NRS pain – walking 15 mins.	41.7	33.7	31.1	-	38.9 (36.0 – 41.9)
VAS – Hip function overall	53.4	57.9	59.6	-	55.0 (52.5 – 57.5)
EQ5D	0.69	0.71	0.72	-	0.70 (0.68 – 0.71)
HSAS	2.3	2.3	2.6	-	2.4 (2.22 – 2.51)



PROMS 2 Year (n=258 (40%))	2012-2017	2018	2019	2020	Mean (95% CI)
HAGOS					
Pain	60.1	67.4	-	-	61.4 (58.6 – 64.3)
Symptoms	55.7	59.0	-	-	56.3 (53.7 – 58.9)
ADL	62.5	70.3	-	-	64.0 (60.6 – 67.3)
Sport & rec	44.0	48.6	-	-	44.8 (41.4 – 48.3)
PA	30.3	35.4	-	-	31.3 (27.4 – 35.1)
QOL	42.0	49.5	-	-	43.4 (40.5 – 46.3)
iHOT ₁₂	52.2	60.6	-	-	56.5 (51.1 – 62.0)
NRS Pain - rest	29.2	20.0	-	-	27.5 (24.4 – 30.7)
NRS pain – walking 15 mins.	38.5	26.3	-	-	36.2 (32.4 – 40.1)
VAS – Hip function overall	55.6	60.1	-	-	56.4 (51.1 – 62.0)
EQ5D	0.71	0.72	-	-	0.71 (0.69 – 0.73)
HSAS	2.6	2.7	-	-	2.6 (2.39 – 2.80)



PROMS 5 Year (n=86 (25%))	2012-2017	2018	2019	2020	Mean (95% CI)
HAGOS					
Pain	65.3	-	-	-	65.3 (60.3 – 70.2)
Symptoms	61.2	-	-	-	61.2 (56.2 – 66.2)
ADL	69.1	-	-	-	69.1 (63.5 – 74.4)
Sport & rec	50.1	-	-	-	50.1 (44.2 – 56.1)
PA	36.3	-	-	-	36.3 (29.5 – 43.1)
QOL	49.6	-	-	-	49.6 (44.1 – 55.1)
iHOT ₁₂	59.1	-	-	-	59.1 (52.0 – 66.3)
NRS Pain - rest	25.6	-	-	-	25.6 (20.0 – 31.2)
NRS pain – walking 15 mins.	32.2	-	-	-	32.2 (25.9 – 38.5)
VAS – Hip function overall	59.5	-	-	-	59.5 (53.8 – 65.2)
EQ5D	0.74	-	-	-	0.74 (0.70 – 0.78)
HSAS	2.5	-	-	-	2.5 (2.13 – 2.80)

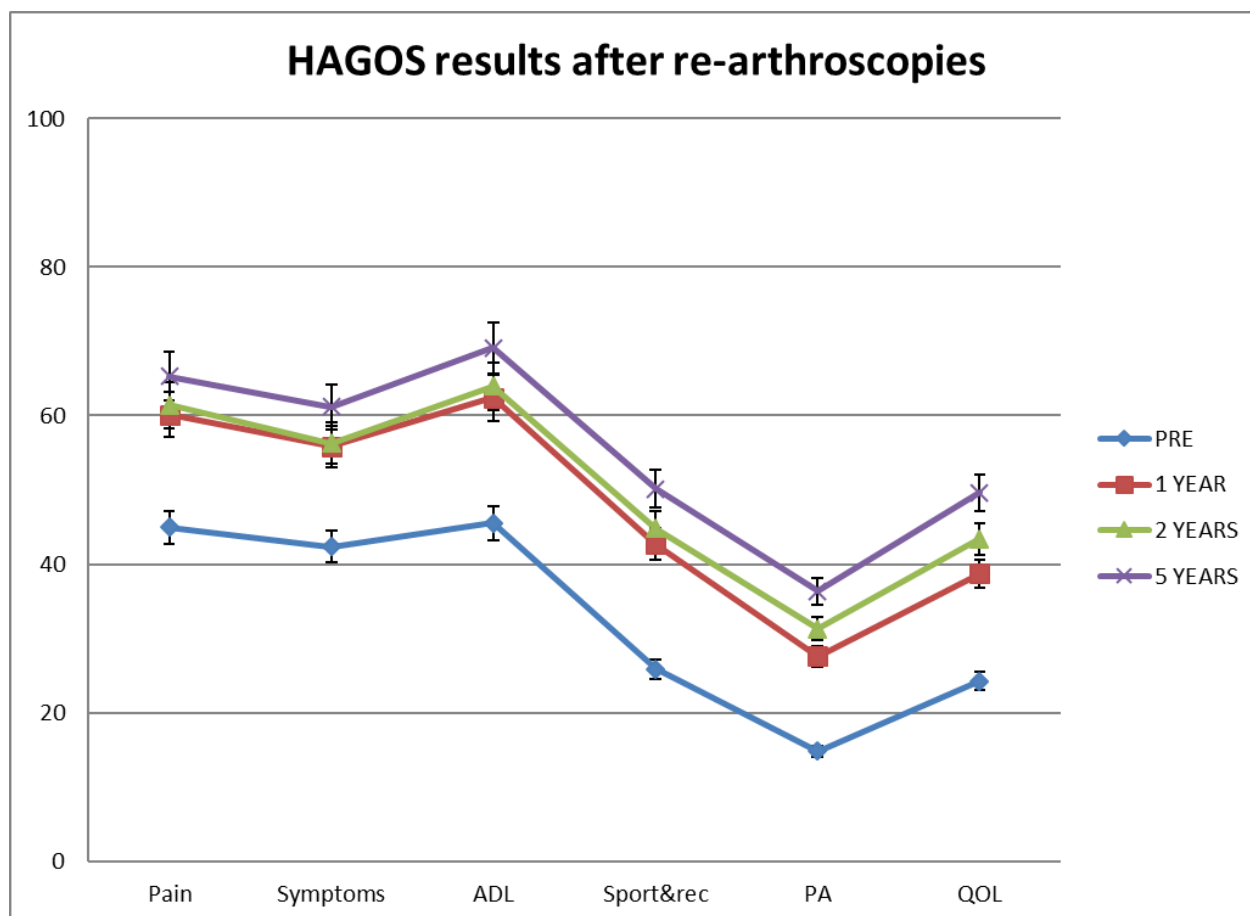


Fig. 13. HAGOS results after re-arthroscopies show the same tendencies, but impaired results compared to primary hip arthroscopies are seen.

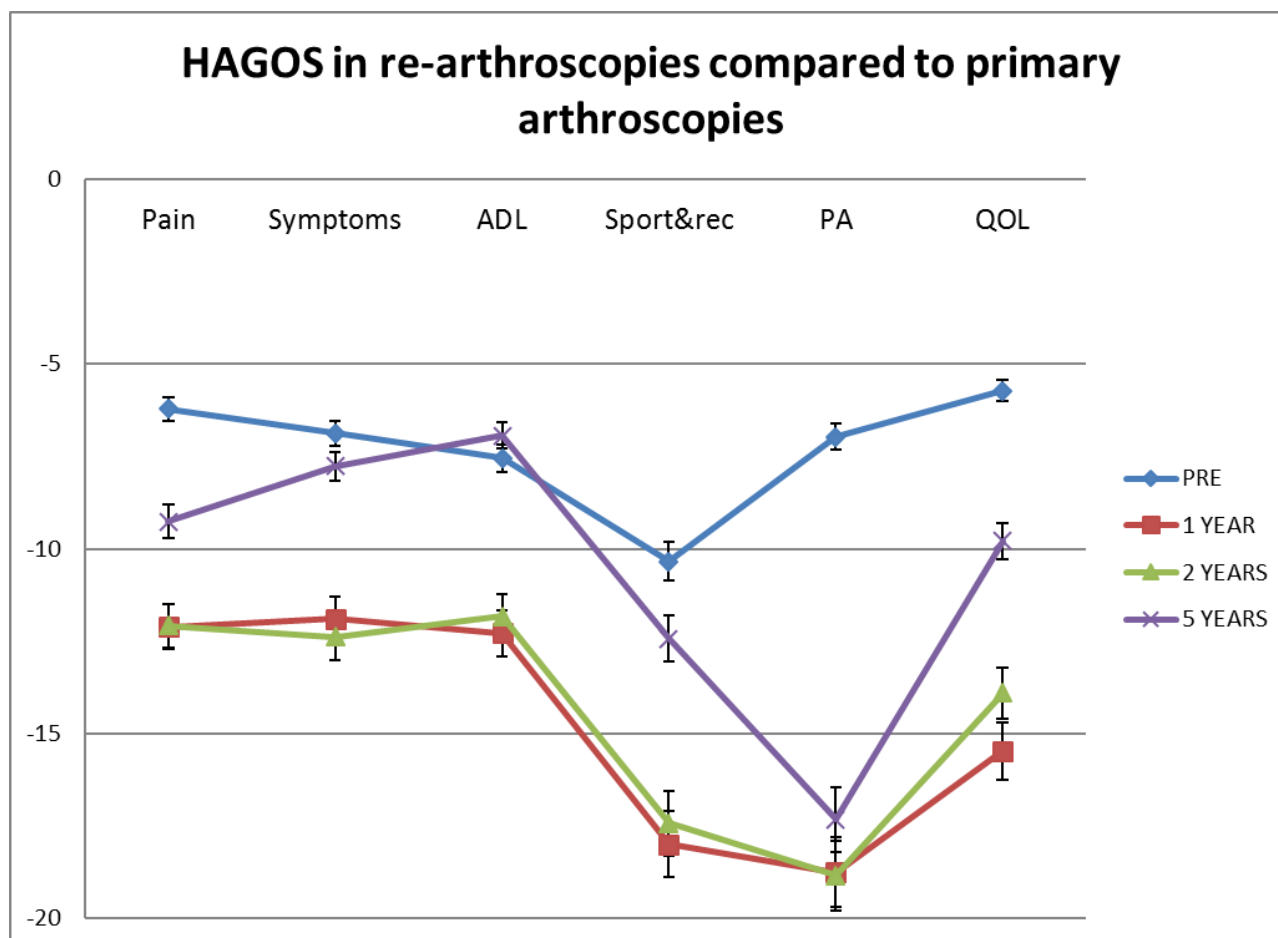


Fig. 14. Shows the difference in mean HAGOS points between primary hip arthroscopies and re-arthroscopies. Data for primary arthroscopies are used as baseline. The negative values shows that the re-arthroscopies have worse results than the primary arthroscopies. There are markedly worse HAGOS results after re-arthroscopies, especially for the physically demanding activities. 5-year results seem to improve a bit except for Physical Activity.

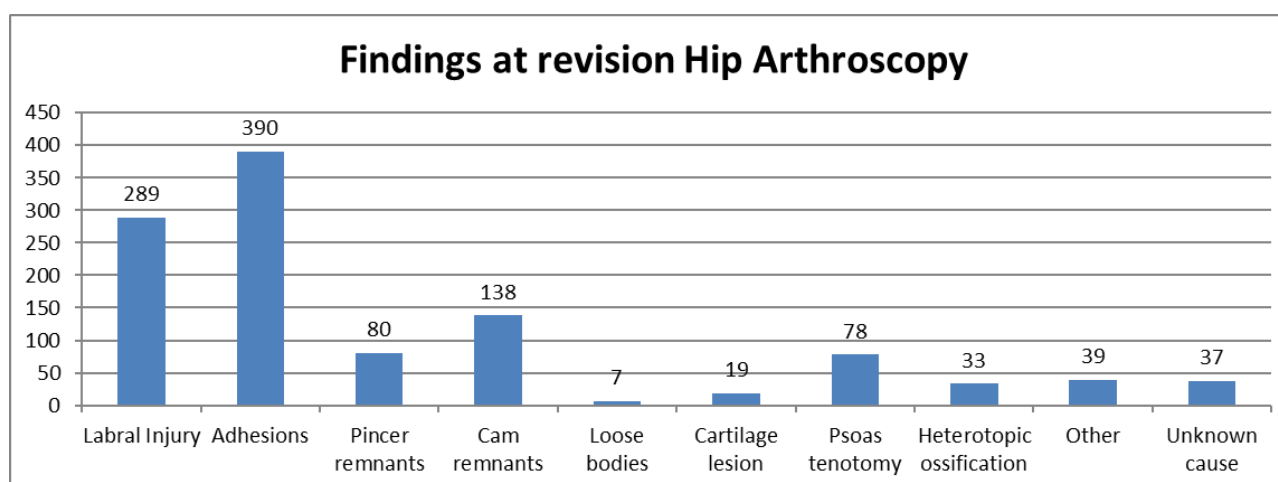


Fig. 15. Cumulated numbers of findings and procedures during re-arthroscopies. This shows the reported findings at revision hip arthroscopy as stated by the surgeons. Most found were adhesions, non-healed labral tears, residual cam and pincer among others.



Dansk resume

I Danmark er hofteartroskoper reguleret af Sundhedsstyrelsen via Specialeplanen for Ortopædkirurgi og er en såkaldt regionsfunktion. Dvs. kun hospitaler og klinikker med denne tildelte funktion må lave hofteartroskoper 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 hofteartroskoper på forsikringspatienter.

Patienterne bedes om at udfylde Patient Related Outcome Measures online før operationen og igen efter 1, 2, 5 og 10 år. (VAS-hoftefunktion, NRS-rest (smerte), NRS-walk (smerte), HAGOS, iHOT₁₂, EQ5D og HSAS score). Pga. en tidligere manglende dansk version er iHOT-12 først blevet tilgængelig fra 2019.

Ved årsskiftet 2020-2021 var der registreret i alt 7046 hofteartroskoper i DHAR. Der er ved årsskiftet registreret 4056 præoperative inklusion PROMs i registeret. Der er 3304 PROMs registreret efter 1 år og der er i alt registreret 2270 2 års PROMs i DHAR. Endvidere er der ved årsskiftet registreret 907 PROMs med et follow-up på 5 år.

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

Bent Lund, Formand, overlæge
Ortopædkirurgisk Afd. Hospitalsenheden i Horsens
bentlund@rm.dk

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 (DHAR) was initiated, and the surgeons started to complete the forms on-line. In total 16 hospitals and clinics are reporting to the DHAR. Most 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, iHOT₁₂, 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 2020 there are included 7046 hip arthroscopies in the DHAR. There are 4056 pre-op inclusion PROMs included in this report. There are 3304 PROMs included at 1-year and there are 2270 2-year PROMs in the registry. So far, we have 907 PROMs with a 5-year follow-up.

Bent Lund, Chairman, Chief Surgeon
Dept. of Orthopedic Surgery
Horsens Regional Hospital, Denmark
bentlund@rm.dk

**Publications from DHAR:**

1. Mygind-Klavsen B, Nielsen TG, Maagaard N *et al.* Danish Hip Arthroscopy Registry: an epidemiologic and perioperative description of the first 2000 procedures. *J Hip Preserv Surg*. 2016 Feb 25;3(2):138-45.
2. Lund B, Mygind-Klavsen B, Nielsen TG *et al.* Danish Hip Arthroscopy Registry (DHAR): the outcome of patients with femoroacetabular impingement (FAI). *J Hip Preserv Surg*. 2017 Apr 4;4(2):170-177. doi: 10.1093/jhps/hnx009. eCollection 2017 Jul.
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. doi: 10.1051/sicotj/2017023. Epub 2017 Jun 14.
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 Sep;46(11):2578-2587. doi: 10.1177/0363546518789070. Epub 2018 Aug 1.
5. 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 Jun 5;6(2):124-133. doi: 10.1093/jhps/hnz017.
6. 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 Sep;47(11):2617-2625. doi: 10.1177/0363546519861088. Epub 2019 Jul 26.
7. 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. doi: 10.1007/s00167-018-4941-3. Epub 2018 Apr 25
8. Poulsen E, Lund B, Roos EM. The Danish Hip Arthroscopy Registry: Registration Completeness and Patient Characteristics Between Responders and Non-Responders. *Clin Epidemiol*. 2020 Aug 4;12:825-833. doi: 10.2147/CLEP.S264683.
9. Mygind-Klavsen B, Kraemer O, Hölmich P, Lund B. An Updated Description of More Than 5,000 Procedures from the Danish Hip Arthroscopy Registry. *J Bone Joint Surg Am*. 2020 Nov 4;102(Suppl 2):43-50. doi: 10.2106/JBJS.19.01496.
10. Mygind-Klavsen B, Lund B, Nielsen TG, Maagaard N, Kraemer O, Hölmich P, Winge S, Lind M. Capsular closure in patients with femoroacetabular impingement syndrome (FAIS): results of a matched-cohort study from the Danish hip arthroscopy registry. *J Hip Preserv Surg*. 2020 Oct, hnaa033, <https://doi.org/10.1093/jhps/hnaa033>



11. Mygind-Klavsen B, Nielsen TG, Lund B, Lind M. Clinical outcomes after revision hip arthroscopy in patients with femoroacetabular impingement syndrome (FAIS) are inferior compared to primary procedures. Results from the Danish Hip Arthroscopy Registry (DHAR). *Knee Surg Sports Traumatol Arthrosc.* 2021 Apr;29(4):1340-1348. doi: 10.1007/s00167-020-06135-w. Epub 2020 Jul 11.