

A Non-Response Study 24-months Following Hip Arthroscopy.

Degree project in Medicine
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List of abbreviations

Antero-posterior: AP

Body mass index: BMI

CAM-pincer-morphology: CPD

Computer tomography: CT

Copenhagen Hip and Groin Outcome Score: HAGOS

Delayed gadolinium enhanced magnetic resonance imaging of cartilage: dGEMRIC

External snapping hip syndrome: ESHS

Femoroacetabular impingement-syndrome: FAIS

Flexion-abduction-external rotation: FABER

Flexion-adduction-internal rotation: FADIR

Hip Sports Activity Scale: HSAS

Iliotibial: IT

Internal snapping hip syndrome: ISHS

International Hip Outcome Tool 12: iHOT-12

Lateral center edge angle: LCEA

Magnetic resonance arthrography: MRA

Patients reported outcome measures: PROMs

Snapping hip syndrome: SHS

Total hip arthroplasty: THA

Visual analogue scale: VAS

Quality of Life: QoL

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1. Abstract

Title: A Non-Response Study 24-months following Hip Arthroscopy.

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Background: Clinics in Gothenburg, Sweden, have since 2011 documented the patient reported outcome measures (PROMs) in a local Hip Arthroscopy Registry in order to evaluate different subgroups, improve diagnostics and further refine treatments. PROMs are collected pre-operatively and with a follow-up time of 1, 2 respectively 5 years post-surgery. One of the main concerns of registry studies is the loss to follow-up as the proper evaluation of data obtained from a registry require a high response rate. The accepted percentage of Non- response could be anywhere from 20% to 60%, which is dependent on the level of Non-response bias.

Aim: The primary aim of this study is to compare potential outcome differences between the Responders and the Late-responders. The secondary aim is to compare baseline characteristics.

Methods: Prospective observational study of registry data. All 503 (397 Responders and 107 Non-responders) participants underwent Hip Arthroscopy in 2015 and/or 2016 due to Hip pain. Non-responders were contacted during July 2019 and encouraged to participate in this study, which includes comparisons of Baseline characteristics and Clinical outcomes at Follow-up.

Results: There were no differences in The Copenhagen Hip and Groin Outcome Score, The International Hip Outcome Tool-12, European Quality of life-5 domains-5 levels, Hip function-Visual analogue scale. However, Late-responders were 16.5% (95% CI: -26.6, -6,4) less satisfied with their operation. This study found four significant differences in baseline characteristics: 1) The Late-responders were 4.10 years younger (95% confidence interval (CI): 1.51, 7.12) 2) Konan type 1b cartilage lesion: Responders 1.7% (95% CI: 0.8, 3.1) versus Late-responders 5.1% (95% CI: 2.2, 9.7) 3) Hip sports activity scale-before symptom onset: Responders 5.40 (95% CI: 5.21, 5.49) versus Late-responders 5.92 (95% CI: 5.53, 6.32) 4) Hip sports activity scale-during adolescence: Responders 5.80 (95% CI: 5.61, 5.99) versus Late-responders 6.42 (6.08, 6.76). There were no significant differences in body mass index, sex, pathologies, symptom duration, Hip sports activity scale-at surgery or other chondral lesions.

Conclusion: The Late-responders have comparable outcomes to that of the Responders. Some baseline characteristics suggest that the Late-responders might differ from the Responders.

Keywords: Non-response, Follow-up, Bias, Hip arthroscopy, Patient reported outcome measures, Registry

2. Populärvetenskaplig sammanfattning - En bortfallsstudie 24 månader följande höftartroskopi.

Ortopedin i Sverige har länge varit i framkant på många områden. En av många framgångsfaktorer är ett tidigt nyttjande av kvalitetsregister, vilka tillåter att kliniker kan jämföra sina behandlingar och rutiner med andra kliniker. Detta gör att styrkor och svagheter i behandlingar lyfts fram och på sikt förändrar hur vården förebygger, utreder och behandlar sjukliga tillstånd. Ett sådant register är det lokala Höftskopiregistret i Göteborg. Detta register omfattar data på patienter som genomgår titthålskirurgi i och kring höftleden, samt följer upp dessa med enkäter för att utvärdera behandlingseffekt.

Kvalitetsregister är ett mycket användbart redskap, men riskerar dessvärre bli föremål för snedvridning som registret inte representerar hela patientpopulationen. Detta är en konsekvens av många patienter antingen väljer att helt avstå från att delta i registret eller på grund av att de faller bort från uppföljningen. Det senare kan ske till följd av exempelvis tekniska skäl, såsom att patienten byter kontaktuppgifter, eller för att behandlingen har gett ett resultat som gjort att patienten saknar intresse i att fortsätta delta i uppföljningen.

Denna studie följde upp patienter som hade opererats på Ortho Center, Göteborg, under åren 2015 och 2016 samt hade fallit ur 24-månadersuppföljningen för att jämföra dessa (Bortfallet) med de patienter som svarade på den tänkta uppföljningen. Bortfallet kontaktades via telefon, där de tillfrågades om de ville delta i jämförelsen. Om patienterna tackade ja fick de ett e-post med en länk till enkätundersökningen. Av de 152 personer som inte hade svarat på uppföljningen så ingick 107 personer i vår studie. De främsta anledningarna till att resterande 45 patienter inte kunde delta var på grund av att de antingen saknade intresse att delta eller hade genomgått en operation som gjorde de var olämpliga att delta, exempel på sådan operation var om de hade fått en höftprotes.

Studien kombinerar subjektiva utfallsmått via enkätsvar och mer objektiva parametrar, såsom diagnos och broskskada vid operationstillfället. Uppföljningen utgörs endast av patientrelaterade data.

Studien visar att bortfallsgruppen är jämförelsebar med svarsgruppen. Studien återfann dock vissa betydande skillnader i sekundära utfall, där bortfallsgruppen var 1) något yngre 2) i högre utsträckning involverade i idrott när de var unga och innan symtomdebut 3) mer sannolika att ha en mindre broskskada i höften 4) mindre nöjda med sin operation. Dock rapporterar de två grupperna samma höftfunktion. Detta kluster kan potentiellt tolkas som att yngre idrottande individer faller ur uppföljningen på grund av att de

inte återfår samma höga aktivitetsnivå som de hade innan de fick symtom av sin sjukdom. Andra studier har dock visat att yngre individer är generellt mer missnöjda med sin sjukhusvård än vad äldre individer är, vilket gör skillnaden i nöjdhet något svårtolkad. Alltså går det i dagsläget inte att utesluta att ovan aktiva grupp har en högre tendens att falla ur uppföljningen, medan studien slår fast att svarsgruppen har lika stor nytta av operationen som bortfallsgruppen.

3. Introduction

Hip arthroscopy is a relatively young discipline, first introduced during the 1980's [1]. Arthroscopy of the hip were at first limited to a few indications, such as debridement of the hip, the usage has broadened as knowledge, surgical techniques and technological tools have advanced [1]. Hip arthroscopy of today most often include surgical correction of femoroacetabular impingement syndrome (FAIS), exostosis, external/internal snapping hip and cartilage damage [2]. Clinics in Gothenburg, Sweden, have since 2011 documented the patient reported outcome measures in a local Hip Arthroscopy Registry in order to evaluate different subgroups, improve diagnostics and further refine treatments [3]. PROMs are collected pre-operatively and with a follow-up time of 1, 2 respectively 5 years post-surgery. All included subjects have been given preceding verbal and written information about the follow-up and agreed to participate.

3.1 Loss to follow-up

One of the main concerns of registry studies is the loss to follow-up as the proper evaluation of data obtained from a registry require a high response rate. If the outcome is associated with the loss to follow-up then the study will require a higher response rate compared to if such bias is non-existent. The data is considered adequate with a minimum of 40% participation and no Non-response bias [4]. If Non-response bias is present, then there are risks of serious underestimations at 80% participation [4]. A Finnish study monitored loss to follow-up during a 25-year period recognized that younger women were more inclined to respond to follow-up than their male counterparts [5]. This becomes problematic as male subjects are more prone to both advanced intraarticular lesions and combined cam-pincer morphology [6], thus possibly benefiting more from arthroscopic intervention than the female group. Another potential mechanism and somewhat well-established truth is that subjects with worse outcome are more prone to be lost to follow-up than those with better outcome. When considering the above studies, then we cannot exclude the possibility that the local Hip registry might be subject to Non-response bias.

Stålman et al. recently analysed the non-response group 2-years following anterior cruciate ligament surgery [7]. This study confirmed that the non-response group are more inclined to

consist of younger subjects and/or men. The study was however not able to identify any differences in outcome when comparing the non-responders to the responders.

It is very plausible that the clientele of hip arthroscopy is very similar to that of knee arthroscopy, thus not generating any differences between the two groups. However, this issue cannot be left investigated, hence our efforts to illuminate if such may be the case.

3.2 Main pathologies corrected through Hip Arthroscopy

3.2.1 Femoroacetabular-impingement

3.2.1.1 Aetiology

The underlying development of FAIS is poorly understood. This issue has been addressed in a multidisciplinary setting and pointed out as a research area of special interest [8].

CAM-pincer-morphology (CPM) with hip pain (i.e. FAIS) has been more frequently reported in populations that are more physically active. CPM has been shown to be a more prominent feature in populations dedicated to domestic/recreational physical activities, compared to those engaged in competitive sports [9]. This finding aligns with the theory composed by Agricola et al. [10] which suggest that CAM-deformities could be the result of structural adaptation in the adolescent due to high impact forces. When surgery-based correction is implemented there is no recurrence of the CAM-deformity [11], which further supports the idea proposed by Agricola et al. The cam deformity seems to be a product of pathological development during closure of the proximal femurs' physis [12]. Laor et al. suggest that physeal widening in the knee amongst child athletes could be due to stress injury [46]. It is tempting to think that the femur neck function in the same manner.

Pincer morphology is due to a deep acetabular socket, which provides an over-coverage of the femoral head and a restricted range of motion in the hip. In the terminal portion of the motion, contact occurs between the femoral neck and acetabular rim. There is a transmission of force via the labrum to the acetabular cartilage, causing ossification at the base of labrum. The ossification is usually quite narrow and located circumferentially the postero-inferior ossification of the labral base is thought to be caused by a posterior subluxation during hip flexion, as contact between the posteriormedial head of femur and posteroinferior. Coxa

profunda is the most common hip morphology associated to pincher, other associated morphologies are protrusio, retroversion and ossification of the labrum [13].

3.2.1.2 Epidemiology

A systematic review by Mascarenhas et al. [29] included studies of asymptomatic, symptomatic and athletic populations evaluating imaging prevalence of findings positive for FAIS-morphology. The findings suggest that FAIS-morphology is overrepresented amongst athletes. The differences between the three groups were the least when comparing the Symptomatic group to the Athletic group, as the only significant difference was regarding the alpha angle. The included radiologic signs in the study were the alpha angle, cross-over sign, CAM-, pincer- respectively CAM-pincer-morphology. These findings will be described in dept in a later segment.

A combined systematic review and meta-analysis by Nepple et al. investigating the association of sports participation and proximal cam-deformity show that the main practitioners at risk are hockey and basketball [30]. The included studies seem to indicate that hockey practitioners are at 10 times the risk, whereas basketball practitioners are at 4 times the risk to develop cam-deformity. All sports involving jumping motions seemed to be associated to cam-deformity [30].

3.2.1.3 Symptoms & clinical findings

The most characteristic symptom of FAI is pain [14], most typically located to the hip or groin, other occurring sites include thigh, buttock, knee and lower back, typically associated with motion or position. Some patients describe mechanical symptoms such as stiffness, locking or giving away [15].

Clinical testing includes flexion-adduction-internal rotation impingement test (FADIR-impingement test) which is performed in supine position. The test is considered positive if the patient experiences familiar pain and/or loss in range of motion. FADIR tests for the most common cam-morphology, located in the anterosuperior portion of the femoral neck to head-neck-junction. A cross-sectional study of young ice hockey players evaluating FADIR as a screening method had during a sensitivity of 41% and a specificity of 47% for cam and/or pincer morphology [16]. Other studies on the FADIR-test show similar results, but with very wide

confidence intervals, which implies that the FADIR-test lacks in specificity [17]. Reiman et al evaluated the FADIR-impingement test using a meta-analysis on candidates for hip arthroscopy, the results suggest that FADIR has a sensitivity and specificity of 0.94-0.99 respectively 0.05-0.09 [18], which makes the FADIR-test a useful tool when differentiating intra-articular hip pain from extra-articular.

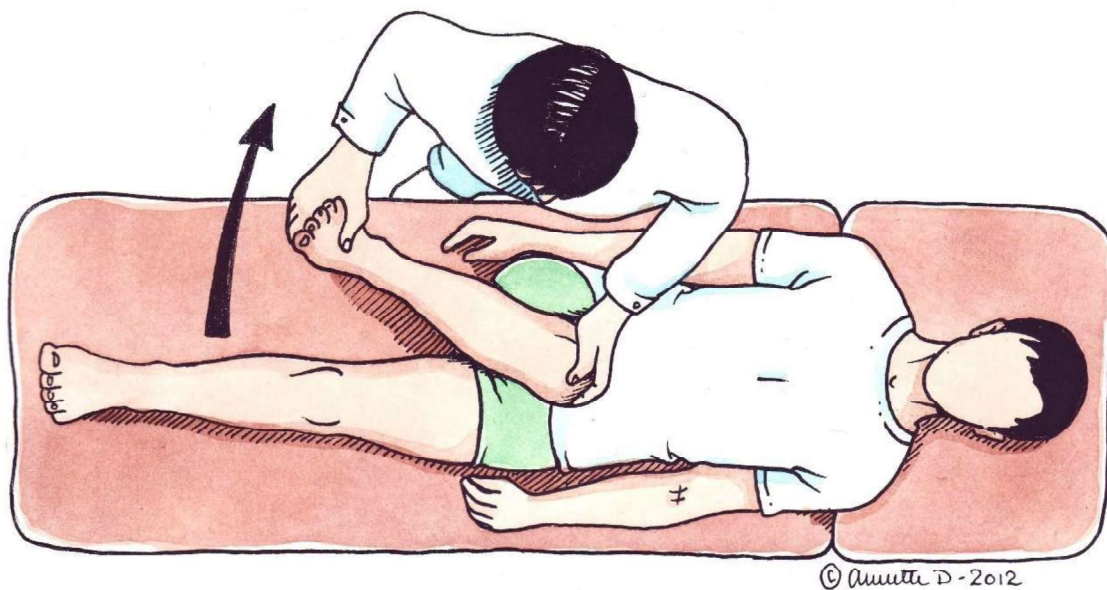


Figure 1. Depicting the execution of the Flexion-adduction-internal rotation-test with the subject in supine position. *Provided by Mikael Sansone.*

The FABER test is performed with the patient in supine position and involves flexion-abduction-external rotation where the examiner applies gentle force. The combined movement is thought to be more sensitive for pistol grip-deformity, a variant of cam lesion, located more laterally in the head-neck-junction than the typical cam lesion. The test is considered positive if the patient experiences familiar pain and/or there is a decreased range of motion. When discriminating intra- from extraarticular pain FABER had a sensitivity of 0.6 while specificity was 0.18 [19]. The FABER distance test is performed in the same manner but without the examiner applying any force, the distance from the lateral knee to the examination table is measured when the leg has come to rest. Phillippon et al showed that the FABER distance test

has a sensitivity and specificity of 0.85 respectively 0.14, but states that the “value of the FDT to diagnose cam FAI is unclear” [20].

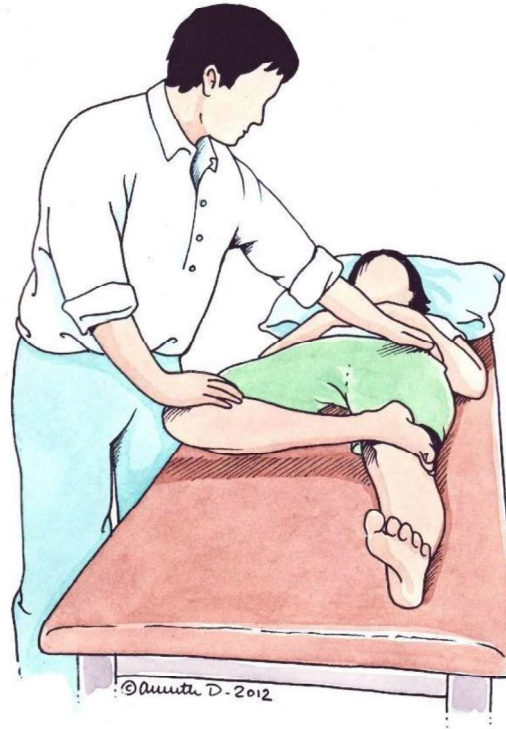


Figure 2. Image depicting the execution of the Flexion-abduction-external rotation-test with the subject in supine position. Evaluating posterior impingement. *Provided by Mikael Sansone.*

Another important tool in the clinical examination of a potential FAIS is the usage of intra-articular injection of anaesthetics. Martin et al evaluated the degree of pain relief when the patient was exposed to the combination of lidocaine, bupivacaine with triamcinolone. The degree of pain relief was compared to MRA-findings, which showed that 57 % with labral tears experienced at least 50 % relief [19]. Reevaluation of hip pain is preferably done within 2 hours post-injection.

A clinical assessment of a possible symptomatic FAIS ought to include radiology. The bony structures are well depicted with a plain radiograph. The initial imaging require both an AP- and lateral-projection of the hip and pelvis, whereas soft tissue damage is depicted through cross-sectional imaging [8]. The hip is not to be depicted in a neutral position but is to be modified depending on the projection. AP-projection require either Lauenstein projection with the hip adducted 45° flexion and 45° abduction or a Dunn view with 45° hip flexion and 20°

abduction. Cross-table projection is performed with the symptomatic hip in 15° external rotation while the contralateral hip is flexed beyond 80°.

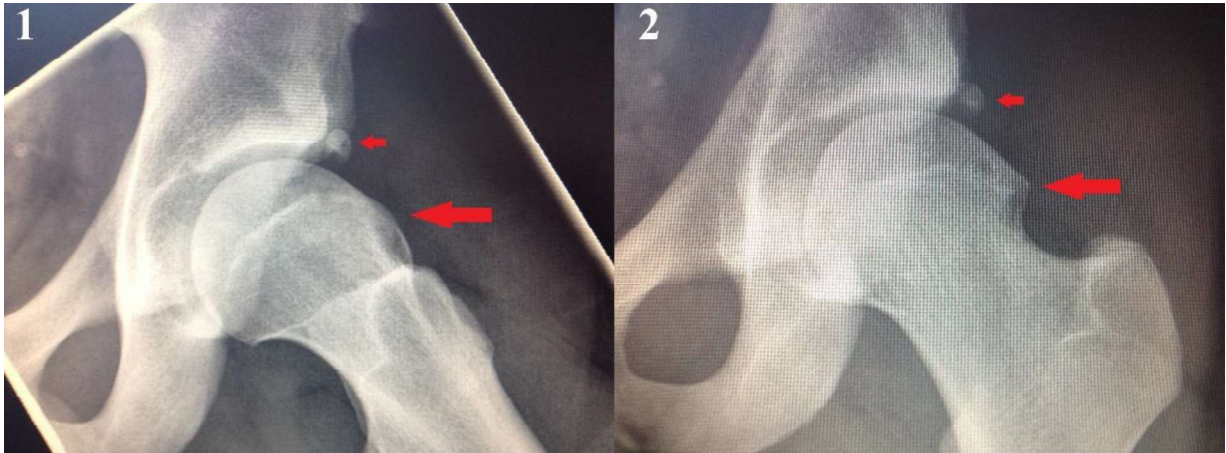


Figure 3. The plain radiographs depict the osseous deformities seen in Femoroacetabular impingement-syndrome. Both images are of left hips. Image 1. (Lauenstein projection): small arrow indicates a pincer-deformity, while the large arrow indicates a cam-deformity. Image 2. (Anterior-posterior-projection, neutral hip): small arrow indicates another pincer-deformity, while the large arrow indicates a pistol grip-deformity. *Photos provided by Mikael Sansone.*

The alpha angle is a means of quantifying the size of the cam deformity but has no value in differentiating symptomatic patients from the asymptomatic. The angle is measured by the angle created by the interception of a line drawn along the femur shaft through the center of the femoral head, and a line drawn from the most proximal part of the cam deformity through the same point in the femoral head [21]. There is no consensus of a positive alpha angle as the upper limit is about 50-55°. The difficulty to set an upper limit is mainly due to two factors: 1) the alpha angle varies with the rotation of the hip [22] 2) symptomatic FAI is due to a dynamic interaction between the femur neck, acetabulum and associated soft tissues [8].

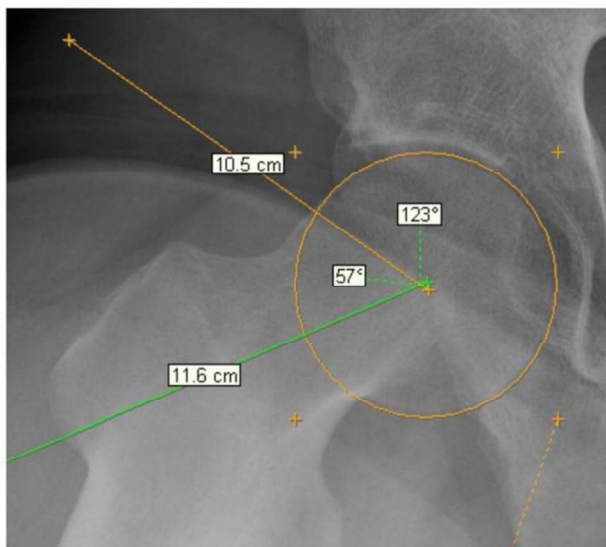


Figure 4. Anteroposterior-radiograph of a right hip with borderline CAM-deformity as the alpha angle is 57° . The orange arrow originates from the center of the femoral head and through the point at which the femoral neck diverges from a perfect circle. Re-used with permission from Springer Nature: Ratzlaff et al. The validity of a non-radiologist reader in identifying CAM and pincer femoroacetabular impingement (FAI) using plain radiography; *Rheumatol Int* 2016; 36(3): 371-6 <https://doi.org/10.1007/s00296-015-3361-7>

The cross-over sign is identified in an AP-projection of the hip and pelvis. It is a sign of partial acetabular retroversion, where the most anterior portion of the acetabular rim has more lateral placement than the posterior acetabular rim. This creates a figure of eight on the plain radiograph [23].

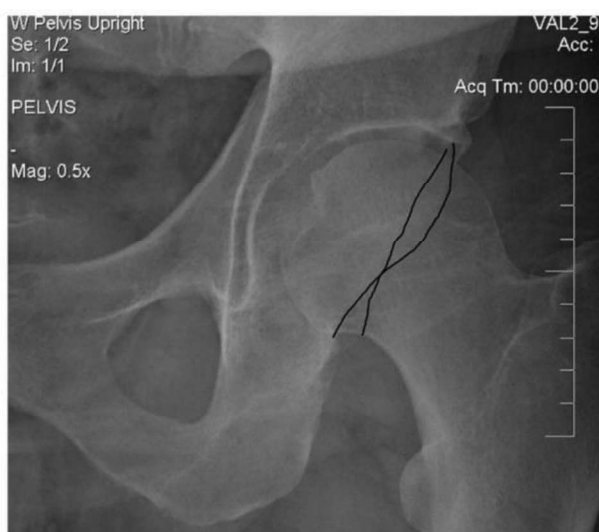


Figure 5. Anteroposterior-radiograph of left hip showing positive cross over-sign. Each of the black lines indicate the contour of the posterior respectively anterior acetabular rim. The midway interceptions create a figure of eight. Re-used with permission from Springer Nature: Ratzlaff et al. The validity of a non-radiologist reader in identifying CAM and pincer femoroacetabular impingement (FAI) using plain radiography; *Rheumatol Int* 2016; 36(3): 371-6 <https://doi.org/10.1007/s00296-015-3361-7>

Posterior wall sign is present in hips with global acetabular retroversion and is depicted in a plain radiograph with an AP-projection of the hip and pelvis. The radiographic finding is that the centre of the femoral head is located laterally to the posterior acetabular rim due to insufficient acetabular posterior coverage of the femoral head [24]. The posterior wall sign may be hinted in Figure 6.

Another means of visualizing a precondition for FAIS-syndrome is the lateral center edge angle. This angle is formed out of a strictly vertical line and one drawn from the center of the femoral head to the most lateral edge of the acetabular rim. [25]. The lateral center edge angle can be depicted in an AP-projection with a neutral pelvic position in a plain radiograph. Normal morphology should generate an angle of 20-40°, whereas above 40° could be interpreted as a positive sign for pincer morphology [26].

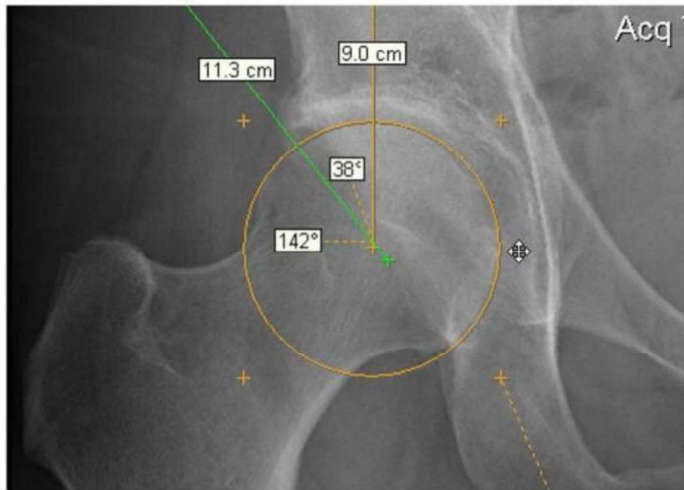


Figure 6. Anteroposterior-radiograph of right hip with a upper limit lateral center edge angle (38°). Posterior wall-sign is also hinted as the center of the circle is located laterally to the lateral contour of the posterior acetabulum. *Re-used with permission from Springer Nature: Ratzlaff et al. The validity of a non-radiologist reader in identifying CAM and pincer femoroacetabular impingement (FAI) using plain radiography; RheumatolInt 2016; 36(3): 371-6*
<https://doi.org/10.1007/s00296-015-3361-7>

Herniation pits appear on a plain radiograph as oval radiolucency with sparse peripheral zone of sclerosis, most commonly found on the femoral neck [113] Herniations pits is a debated indicator for FAIS as different studies suggest varying correlation between these two conditions. The result varies with the clientele and the imaging technique [27, 28]. Herniation pits as an indicator for FAIS is best applied when using CT on patients with mechanical hip dysfunction, as Ji et al. suggests a significant correlation on this clientele, while also reporting a higher prevalence amongst pincer-type FAIS [28].

3.2.1.4 Treatment

The treatment of FAIS consists of different combinations of conservative therapy, surgery and rehabilitation [8]. More research is needed to compare the different treatment strategies, as there is limited evidence of superiority. Griffin et al. compared arthroscopic intervention to conservative treatment 12 months after randomization, which suggests that both alternatives provide significant results, but that arthroscopy is superior to conservative care [31]. The Warwick agreement on FAIS [8] states that advanced FAIS ought to be treated in a multidisciplinary setting with access to all the available treatment options.

Conservative care is led by physiotherapists and includes a package of patient education, adaptation of lifestyle and activity, watchful waiting and pharmaceuticals [8, 32]. Preferred pharmaceuticals are non-steroidal anti-inflammatory drugs or intra-articular injections of steroids. The adaptation of lifestyle foremost includes exercise with the key features of individualization, progression and supervision [32].

Surgery is the means to restore hip morphology, thus creating a hip motion without impingement. CAM-morphology is most often reshaped into a morphology with a lesser alpha angle, whereas pincer is corrected by trimming and/or reorienting of the acetabulum. If there is simultaneous damage to the cartilage or labrum they can be corrected by resection, reparation and reconstruction [8]. Matsuda et al. compared open dislocation, mini-open and arthroscopic surgery for FAIS [33] and concluded that open dislocation is associated to a relatively high rate of major complications, due to primarily trochanteric osteotomy-related issues; mini-open is associated to damage to the lateral femoral cutaneous nerve; whereas arthroscopy is equal or superior to both options in terms of both surgical outcomes and complications rates.

The following arthroscopic correction of FAI-morphology is used at Ortho Center, Gothenburg [34]. The patient is either fully sedated or in spinal analgesia and placed in supine position on a traction table. Access to the hip is provided by an antero-lateral portal (anterior to trochanter major) and a mid-anterior portal (distal and medial to the antero-lateral portal). The peripheral compartment is accessed through a ligament-sparing capsulotomy, parallel to the fibers of the ileo-femoral ligament while minimizing the transverse cut. Pincer is preferably removed using a technique that remodels the acetabular rim without chondral-labral separation i.e. over-the-top [35], where the burr is placed in the peri-labral sulcus. Small resections of the acetabular rim allow for the labrum to be left in-situ, whereas larger resections require for the labrum to be reattached using suture anchors. CAM-deformities are corrected by initially removing the overlying cartilage and then removing the bony deformity using the burr. A dynamic assessment using intra-operative fluoroscopy ensures the reshaping of the femoral neck into a cylindrical form and elimination of identifiable impingement.

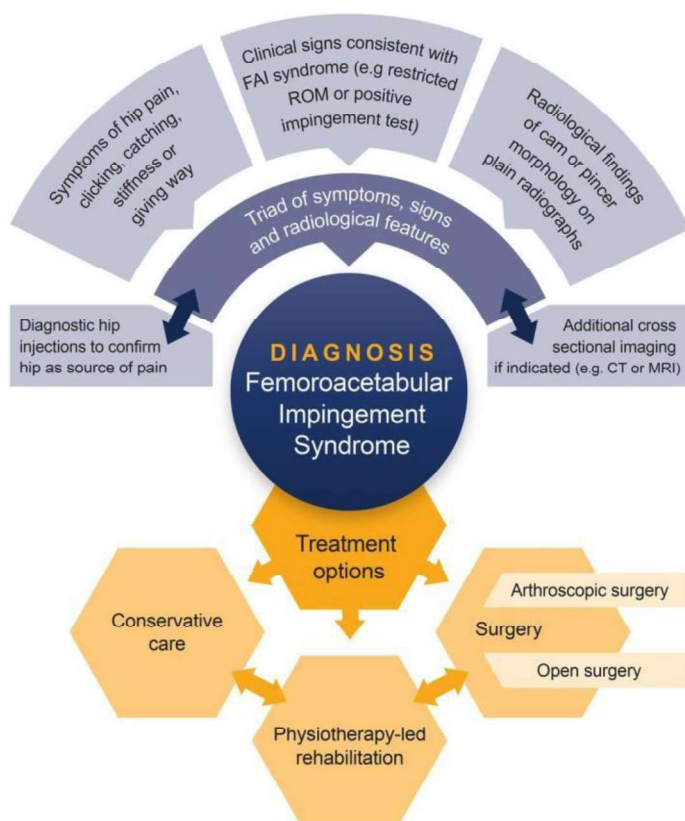


Figure 7. Flow chart when dealing with patients suffering from potential Femoroacetabular impingement-syndrome. The grey area signifies diagnostic testing. The black arrows indicate alternative pathways when dealing with troublesome diagnostics. The grey-blue area signifies the diagnostic criteria for Femoroacetabular impingement-syndrome. The yellow area signifies the different treatment options. *Re-used with permission from BMJ Publishing Group Ltd: Griffin DR, Dickenson EJ, O'Donnell J, et al. The Warwick Agreement on femoroacetabular impingement syndrome (FAI syndrome): an international consensus statement. British Journal of Sports Medicine 2016; 50(19): 1169-76. <http://dx.doi.org/10.1136/bjsports-2016-096743>*

3.2.1.5 Outcome

Sansone et al. recently published an article presenting the PROMs from the 2-year follow-up after hip arthroscopy [36]. The study presents significant improvements throughout all outcomes. Included outcome measures will be presented below.

The International Hip Outcome Tool (iHOT-12) [83] evaluates the patient's quality of life regarding the hip using a 12-item questionnaire. The patient answers each question by marking a visual analogue scale between two opposing statements. The score is presented as the mean, providing a figure between 0-100. That patients treated at Ortho Center experienced a mean improvement score of +23 ($p < 0.05$), thus indicating that the patients' overall hip-related quality of life (QoL) improved due to surgery.

The European Quality of Life Questionnaire (EQ5D-5L) [84] consists of descriptive system and a visual analogue scale by which the patients estimated their quality of life. The score of each descriptive dimension is converted into an index, where a higher index indicates lesser

QoL. The VAS-score is presented in a 0-100 scale, 100 representing “The best health you can imagine”. Sansone et al. found that the descriptive index-change was -0.17, whereas the VAS -change was +0.08. Both changes indicate increased QoL due to hip arthroscopy.

The Copenhagen Hip and Groin Score (HAGOS) [85] has 5 subscales covering symptoms, pain, function in daily living, function in sport and recreation, participation in physical activities and hip and/or groin related QoL. HAGOS utilizes Likert scales, where the patient is to choose one amongst five alternatives and includes 37 items. Each alternative corresponds to scores between 0-4, where 0 indicates no problem. The sum of each dimension is transformed into a 0-100 scale using a specific formula for each dimension. 0 represents extreme problems whereas 100 represents no problems. The patient is only to consider the past week when filling out the questionnaire. The following subscale-changes were significant: symptoms (+18), pain (+20), daily activity (+18), sports (+25), physical activity (+28) respectively QoL (+25).

VAS of overall hip function improved significantly with 21 points.

Hip Sports Activity Scale (HSAS) grades the patient in an activity level from 0-8, the higher the level the more the patient is engaged in hip-stressing activities [37]. HSAS-change in the 2-year follow up was 0.7. The authors suggest that the modest effect could be due to that the subjects could be inclined to maintain their activity level despite increased QoL.

There seems to be no bony regrowth of a corrected cam-morphology [11]. The revision rates for the arthroscopic correction of FAI-syndrome are 3-9 % [38]. The main causes for revision surgery seem to be unaddressed or under-resected cam- or pincer-morphology. Resection of pincer-morphology is three times more likely during revision surgery compared to the primary surgery. If revision surgery was performed, it was performed 25.6 months after the primary surgery [39]. Other causes for revision surgery are a tight psoas tendon or failed labral repair [40].

Complications are relatively rare with a rate of 1.4 %, known complications are transient neuropraxia, portal hematoma, portal bleeding, infection or trochanteric bursitis [41]. The serious and permanent complications are rare with a rate of 0.5 % including avascular necrosis or severe scuffing of the femoral head [42]. There are also known cases of femoral neck fractures due to overly aggressive CAM-resections or notching, causing a weakening in the

femoral neck [114] A review compared heterotopic ossification when NSAID was administered post-surgery to when no NSAID was administered and this suggest that the incidence was 3 % respectively 13 % [45].

Known risk factors for revision surgery or poorer outcome include acetabular over-coverage, pistol grip-deformity, pre-operative osteoarthritis and hip dysplasia [43, 44]. The two latter are to be considered relative contra-indications, with total hip arthroplasty as an alternative to both arthroscopy and open surgery [44].

3.2.2 Labrum injury

3.2.2.1 Aetiology

Beaule et al. proposed that labral injury should be categorized into one out of four groups 1) Traumatic 2) Congenital, due to acetabular dysplasia 3) Degenerative 4) Femoroacetabular impingement [47]. Labrum injury in the hip is closely associated to bony abnormalities [48]. This was suggested in a retrospective study of conventional radiographies amongst patients with labral pathology, which found that 87 % of patients with labral pathology had a simultaneous bony abnormality. This opposed the idea that labrum injury was mainly caused by traumatic events such as hip dislocation [49], while also suggesting an alternative aetiology to a former idiopathic form of labral injury [47, 50]

3.2.2.2 Epidemiology

Acetabular labral tears are common amongst the young adult asymptomatic population, with a prevalence suggested to be 38.6 % [51]. The prevalence amongst the general population is thought to be 5-6 %, whereas dancers could have a prevalence as high as 23.5 % [52].

3.2.2.3 Symptoms & clinical findings

The onset of symptoms is often insidious with pain in the hip, gluteal or trochanteral that progress with mechanical loading of the hip [47]. Even though labral tears have been historically viewed as caused by traumatic events, there are relatively few traumatic events in groups with labral tears. Burnett et al. performed a retrospective study where 60.6 % was associated with low-energy trauma, whereas 0.909 % were associated with major trauma [53].

Mechanical symptoms such as unpredictable locking of the hip and painful clicking are also associated to labral tears [55].

Arthroscopic classification of the labral injury depends on the morphology of the lesion. Lage et al. proposed the following classification of labral tears shown in figure 8. [50]. Radial flaps are often discrete disruptions the free margin of the labrum, most common lesion (56.8 %). Radially fibrillated lesions have a hairy appearance at the labrum's free margin, second most common lesion (21.6 %). The longitudinal tears appear at the labrum's periphery most often at the insertion, third most common lesion (16.2 %). Unstable tears do not have a specific pattern but cause instability in the hip, least common (5.4 %).

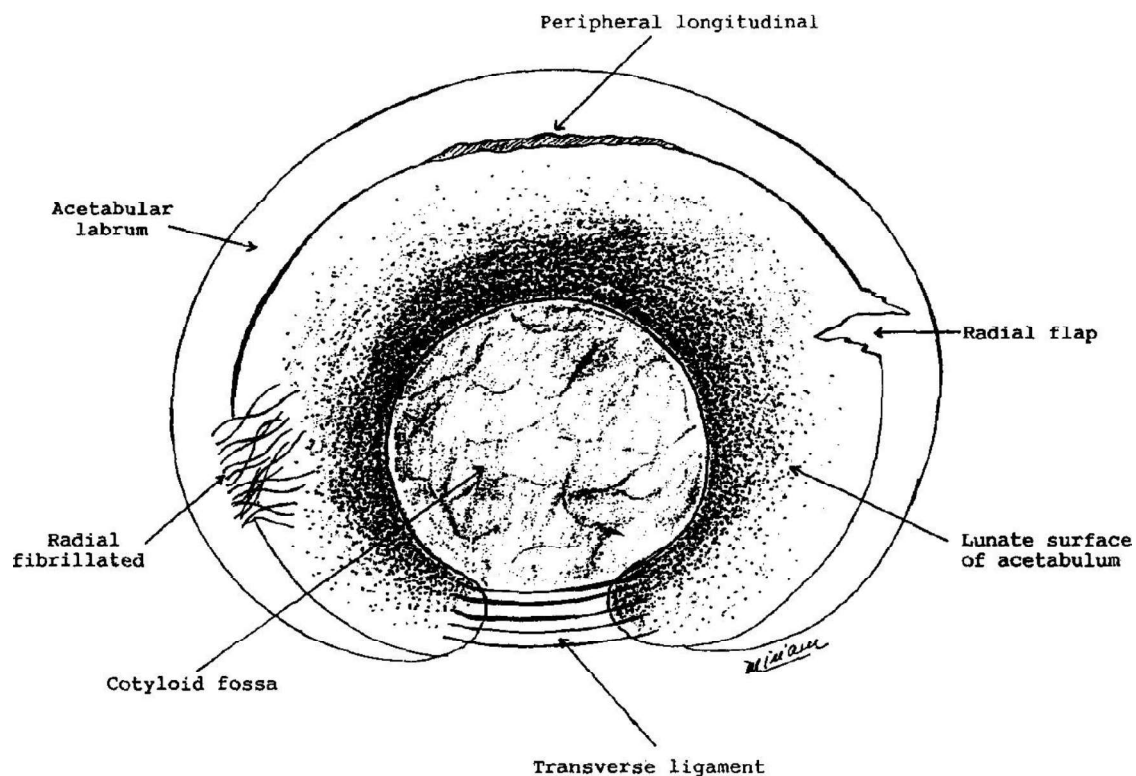


Figure 8. Illustration of the different classes of labral tears. *Re-used with permission from Elsevier: Lage, Lafayette A. et al. The acetabular labral tear: An arthroscopic classification. Arthroscopy 1996; 12(3): 269 – 27* [https://doi.org/10.1016/S0749-8063\(96\)90057-2](https://doi.org/10.1016/S0749-8063(96)90057-2)

Another classification of labral tears is based on the location, being classified as anterior, posterior and/or superior/lateral [54]. The most common sites of labral lesion are the anterior, anterior-superior or superior regions [55]. The following two manoeuvres are adequate when differentiating an anterior labral tear from a posterior [55]. Identifying an anterior tear: bring

the hip into flexion, external rotation and full abduction, followed by a combined extension and internal rotation. The test is positive for anterior tear if pain is provoked during shift. Identifying a posterior tear: bring the hip into full flexion, internal rotation and adduction followed by bringing the hip into combined extension, abduction and external rotation. The reproduction of pain is positive for a posterior tear.

Plain radiography of the hip could be used to identify conditions predisposing labrum injury but cannot identify a labrum tear. Nevertheless, an AP- and lateral view of the hip and pelvis evaluation any bony abnormalities ought to be included when diagnosing a potential labral tear [47, 55]. In order to make a full pre-operative evaluation of the potential labrum lesion an MRA is needed. MRA is an invasive technique utilizing a gadolinium-based contrast that is injected in the hip. The contrast will fill any potential tears, leading to an increased signal from these areas [47, 55]. Figure 9. shows an MRA of a hip with a labral tear. The accuracy and specificity vary from studies, all studies suggest that both are above or equal to 90% [47, 55].

Hip arthroscopy is considered the gold standard for detecting labral tears [47, 55].

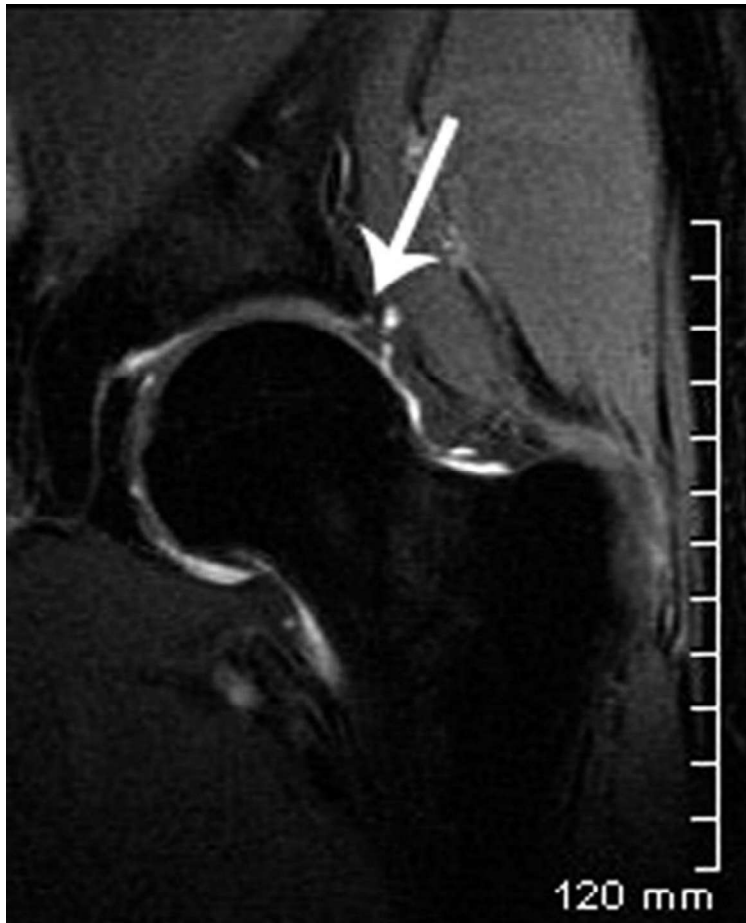


Figure 9. Magnetic resonance arthrography of a hip joint. Coronal view. Arrow indicating a labral tear at the chondrolabral junction. *Re-used with permission from Wolters Kluwer Health, Inc: Beaulé et al. Acetabular Labral Tears J Bone Joint Surg Am 2009; 91(3):701-10. DOI: [10.2106/JBJS.H.00802](https://doi.org/10.2106/JBJS.H.00802)*

3.2.2.4 Treatment

Surgical correction could be performed open, mini-open or arthroscopic [57]. Arthroscopic access to the hip has been described above, excluding distraction as it is not needed to correct labral tears. Most knowledge of surgical treatment of labral tears derive from studies regarding FAIS. Espinosa et al. performed a study comparing cohorts either receiving labrum resection or reattachment following trimming of the acetabular rim or femoral osteochondroplasty [56]. The group receiving labrum reattachment recovered faster and had better clinical results indicating that reattachment is the preferred option [56], which align with a result from a more recent systematic review [57]. Whether or not the labrum will be subject to suturing with anchors, reconstruction or debridement depend on the morphology, location, overall labral quality, in the labrum is stable, and if there is a previously failed labral repair [59].

Surgical correction of labral tears seldomly only involve labral reattachment or debridement, but also correction of the underlying bony abnormality [47].

3.2.2.5 Outcome

Renouf et al. evaluated PROMS 1.7 years subsequent to arthroscopic labral repair using the iHOT-33 [58], an extended version of the iHOT-12 that is used in Gothenburg. The study suggest that labral repair could improve the PROMs in this middle-aged group with isolated labral tear and without any bony deformities in the hip. Renouf et al. had the following mean changes: Symptoms & functional limitations +32.0 ($p = 0.019$); Sports & recreational activities +31.6 ($p = 0.020$); Job-related concerns +33.9 ($p = 0.020$); and Lifestyle concerns +33.9 ($p = 0.020$). A high score in Sports & Recreational Activities indicate the patient's ability to participate in such activities, whereas a high score in the other sections indicate a lack of concerns. The maximum score is 100.

Lee et al. recently published a study of outcome following arthroscopic labral repairs associated with FAI-syndrome, with a mean post-operative follow-up at 92.4 months. The radiological follow-up did not show a non-significant progress in Tönnis grade when comparing the hips pre- and post-operatively, that showed 0.51 respectively 0.67 [60]. Preoperative Tönnis grade 2 is associated with a poorer PROMS 5-years after arthroscopic labral repair [61].

3.2.3 Cartilage lesions

3.2.3.1 Aetiology

Most chondral lesions of the hip occur in the acetabular side as 59 % of defects are in the anterior acetabulum, whereas 24 % occur in the superior acetabulum [62] and are often associated to labral tear [63]. Chondral lesions of the hip most often result due to mechanical overload, there are many conditions that increase the susceptibility for chondral lesions, such as FAI-syndrome or hip dysplasia [64, 66].

Several classification systems of chondral lesions have been described [64]. Ortho Center, Gothenburg, employ Konan`s chondral classification, which relies on severity and size of the lesion. The size of the lesion is put into relation to the distance between the labrum and acetabular (Cotyloid) fossa [64]. Different degrees of severity: 0) Normal 1) Wave sign 2) Cleavage tear 3) Delamination 4) Exposed bone. Different sizes: A) <1/3 the distance B) 1/3-2/3 the distance C) >2/3 the distance. There is an expanded version of Konan`s system that is better fitted for FAI-syndrome that also consider the involved acetabular region [65]. This expanded version is not used in Gothenburg.

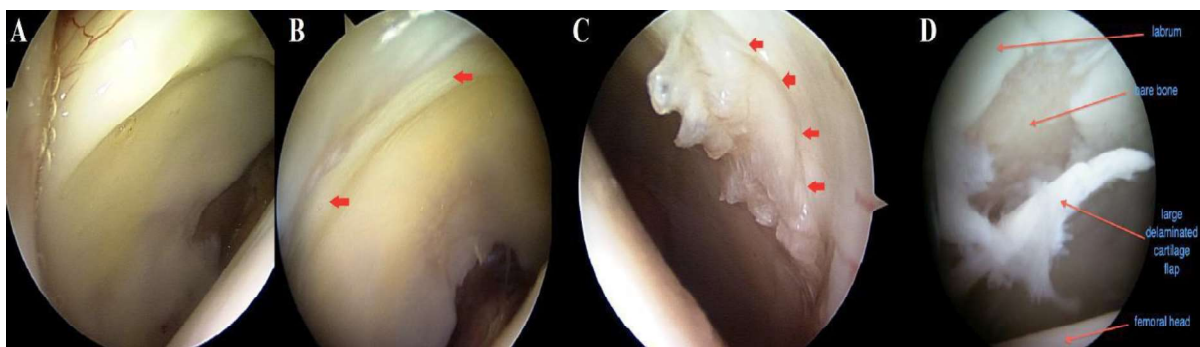


Figure 10. Arthroscopic views of different cartilage lesions in the hip. Note that Konan grade 2 is not represented above. A) Konan grade 0, normal hip B) Konan grade 1, arrows indicate wave sign C) Konan grade 3, arrows indicate delamination D) Konan grade 4. *Provided by Mikael Sansone.*

3.2.3.2 Epidemiology

Suarez-Ahedo et al. [67] performed a cross-sectional study evaluating intra-operative findings of chondral lesions amongst patients with hip pain. Only 18.4 % of the included subjects had normal cartilage. FAIS, labral tear and ligamentum tear were the most common findings amongst the group with chondral lesions.

A study by Shibata et al. [68] suggests that different predisposing conditions create distinct patterns of chondral lesions. The group compared patients with and without hip instability, showing that patients with hip instability are more likely to have chondral defects 2-4 o'clock or 11-1 o'clock, whereas patients with FAIS had chondral defects located 11-3 o'clock.

3.2.3.4 Symptoms & clinical findings

The most typical symptom is pain during both passive and active movement in the hip, but this symptom is rather a sign of labral or chondrolabral engagement as the hip cartilage lack nociceptors [69, 70]. Common mechanical symptoms are clicking and locking of the hip [64] but lack specificity as they are also common in conditions such as FAI syndrome or labrum lesions, which may co-exist with a cartilage injury. Dallich et al. [63] suggests that the clinical assessment of possible cartilage lesions ought to follow a 21-step physical examination of the hip with the patient in standing, supine, prone and lateral positions [71]. This is due to cartilage lesions possibly being secondary to a wide array of pre-existing conditions.

A plain radiograph is used to identify bony abnormalities and to evaluate potential narrowing of the hip joint space or other stigmata of osteoarthritis [64]. In order to evaluate soft tissue a CT- or MR-arthrography is needed. Whether MRA is superior to CTA is debateable [72, 73]. MRA seems to be the more popular alternative with CTA as an adequate alternative when MRA is not suitable [72, 73].

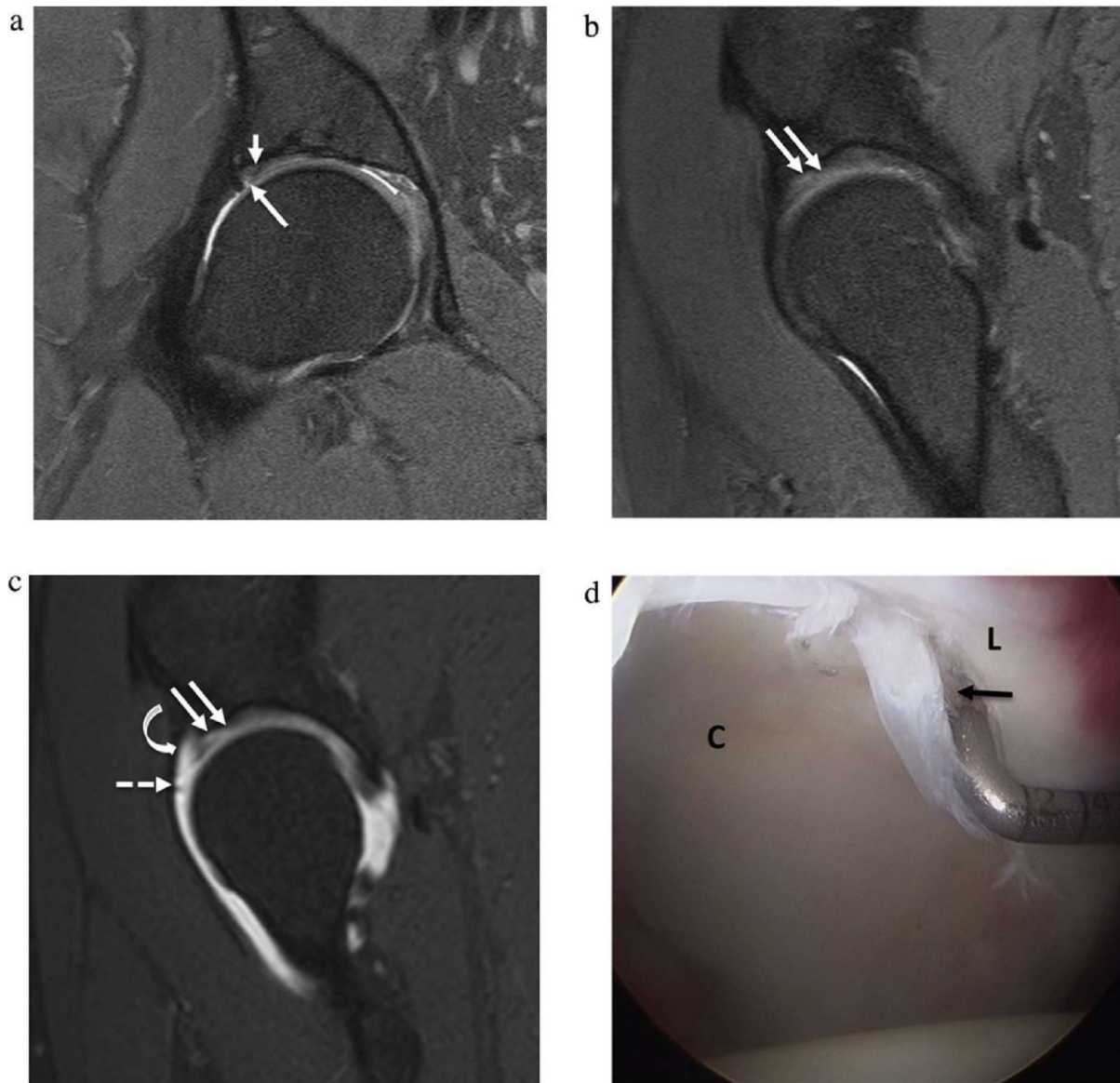


Figure 11. Full-thickness chondral lesion in 52-year old male with Femoroacetabular impingement. a) 3T non-contrast magnetic resonance in coronal view: long arrow indicating separation, while the short arrow indicated fraying b) High resolution-proton density with fat suppressed in a coronal view: the arrows indicate a hyperintense signal suggesting a complete chondral lesion c) T1 wi fat suppressed magnetic resonance arthrography in a sagittal view: Long arrow showing the medium filling the cartilage lesion; curved arrow indicate a perilabral recess; dashed arrow indicate an artefact due to an intra-articular air bubble d) arthroscopic view of the same joint: arrow showing a tear at the chondron-labral transitional zone. *Re-used with permission from Elsevier: Crespo- Rodríguez et al. The diagnostic performance of non-contrast 3-Tesla magnetic resonance imaging (3-T MRI) versus 1.5-Tesla magnetic resonance arthrography (1.5-T MRA) in femoro-acetabular impingement; Eur J Radiol 2017; 88: 109-16: DOI: [10.1016/j.ejrad.2016.12.031](https://doi.org/10.1016/j.ejrad.2016.12.031)*

Palmer et al. [74] suggest that delayed gadolinium enhanced magnetic resonance imaging of cartilage (dGEMRIC) could have a role in predicting cartilage damage caused by cam deformity and the development of osteoarthritis. dGEMRIC is not considered a routine practice when evaluating chondral lesions in Gothenburg.

3.2.3.5 Treatment

Dallich et al. propose the consideration of the two following algorithms when deciding upon the most suitable surgical approach [64]. Oliver-Welsh have suggested a general treatment algorithm for treating chondral lesions in the knee [75], which considers pain, dysfunction, activity-level, size and concomitant pathologies in the same joint. The different surgical modalities are chondroplasty, microfracture with or without mononuclear concentrate in a platelet-rich plasma, grafts, chondrocyte implantations. The other algorithm is proposed by el Bitar et al. and is created for chondral lesions in the hip and distinguishes between lesions in the femoral head and acetabulum [76]. Included treatment modalities for the acetabulum: microfracture and total hip arthroplasty. Included treatment modalities for the femoral head: microfracture, sutures, grafts and total hip arthroplasty.

The clinics in Gothenburg solely use microfractures and are reserved for larger lesions. There are some prospects to widen the arsenal to also include grafts. Non-operative treatments are the same as for labral injuries including intra-articular injections of cortisone, oral NSAIDs and physiotherapy [77].

Microfracture is a technique that utilizes the stem cells in the underlying bone marrow and blood to form new cartilage. The procedure is initiated with debridement of cartilage and the superficial calcified bone layer followed by drilling or tapping 3 mm wide and 6 mm deep holes with 3 mm distance between the holes [78]. The procedure may also be performed by drilling the holes.

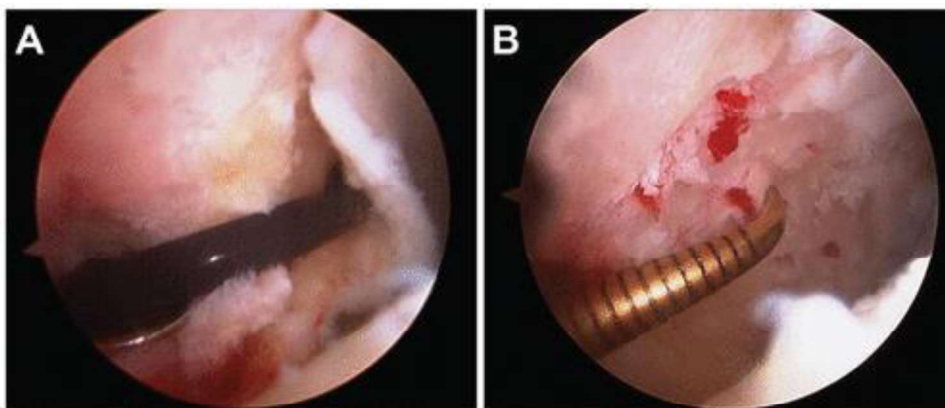


Figure 12. Intraoperative view of A) debridement of chondral defect B) microfracturing the exposed bone by tapping the holes. *Re-used with permission from SAGE Publications: Trask et al. Analysis of the Current Indications for Microfracture of Chondral Lesions in the Hip Joint. Am J Sports Med 2016; 44(12): 3070-6: DOI: [10.1177/0363546516655141](https://doi.org/10.1177/0363546516655141)*

3.2.3.6 Outcome

There are some risks to microfracture such as ossification, fragility and poor quality of the new tissue with an inclination to breakdown [64, 79]. There is an increased risk of poor outcome on osteoarthritis-patients with Tönnis grade 3 and above, which was suggested after comparing FAI-groups with and without osteoarthritis [80].

Marquez-Lara et al. performed a systematic review of arthroscopic management of hip chondral defects [81]. This review suggests 4 postoperative outcomes: 1) 77-95.8% of elite athletes return to their preinjury level of play before the end of next season 2) 12.1% of patients underwent second look arthroscopy due to continued pain, discomfort or mechanical symptoms 3) 0.5-8.9% of patients received a total hip arthroplasty (THA) or resurfacing 8-18 months after surgery, most patients had signs of osteoarthritis 4) Significant improvement in PROMs compared to preoperative scores.

Complications due to hip arthroscopy when correcting chondral lesions are similar to those found when correcting FAI-syndrome [82].

3.2.4 Snapping hip syndrome

3.2.4.1 Aetiology

Snapping hip syndrome (SHS) is categorized into intra-articular, internal and external, which is determined by the anatomical location of the pathology. SHS is most commonly an overuse phenomenon, thus its nickname dancer's hip, in combination with predisposing conditions such as tightness in the iliotibial band or the associated muscles [86]. Intra-articular SHS could theoretically be caused by any derangement in the hip joint [89].

Internal snapping hip syndrome (ISHS) is most commonly caused by a mechanical conflict between the iliopsoas tendon and underlying bony structures, such as the anterior portion of the femoral head or the iliopectineal eminence [82, 86]. The motion that most often triggers the snapping is the transition from above 90° hip flexion into extension [82]. Other potential causes are paralabral cysts or a bifurcation in the iliopsoas tendon. 50 % of ISHS appear simultaneously as an intra-articular pathology [86].

External snapping hip syndrome (ESHS) is mainly due to the iliotibial band, fascia lata or gluteus maximus applying stress to the greater trochanter upon flexion, extension and internal rotation in the hip [86], which may trigger trochanteric bursitis [82]. There have been cases of ESHS following trauma, THA (coxa vara) or rarer osteochondroma in the greater trochanter [86, 87].

3.2.4.2 Epidemiology

The prevalence is appreciated to be 5-10% of the general population, with the majority not experiencing any associated pain [86]. Affected groups are those involved in repetitive hip motions in competitive or recreational activities, with women being slightly more affected than men [86]. Recurring or persisting symptoms may persist, especially when the patient has an underlying pathology [82]. Winston et al. studied self-reported prevalence of SHS amongst elite ballet dancer, out of the population 91%, out of which 58% had painful-SHS, while 7% had to take time off due to pain [88].

3.2.4.3 Symptoms & clinical findings

Snapping or locking of the hip joint are the most characteristic symptoms. Intermittent symptoms are more common for intra-articular pathology. The patient is most often able to pinpoint or reproduce the snapping upon examination. A thorough palpation around the hip joint may identify the site of pathology by reproducing pain [89].

The motions that most often trigger ISHS is the transition from above 90° hip flexion into extension or from FABER-position into combined extension, adduction and internal rotation [82, 89]. There are two provocative tests for ESHS, with one being internally and externally rotating a both extended and adducted hip, while the other test is transitioning from hip flexion into extension and vice versa [91, 92].

The physical exam ought to include other hip-pathologies as SHS often has concomitant lesions associated to the hip. Examples are the gait test for Trendelburgs, Ober's test for iliotibial band tightness, or FADIR-test for impingement.

The diagnosis of SHS is clinical, thus no need to further access the hip by imaging. A plain radiograph could be used in order to rule out bony abnormalities such as coxa vara or hip

dysplasia [93]. Other potential imaging techniques but more suited for soft tissues are MRI, MRA and ultrasound for detecting tendinitis and bursitis [92, 94], or fluoroscopy for dynamic assessment during hip motion [93]. However, an MRI should proceed any surgical procedure in order to carefully identify relevant structures, which is part of the standard procedure at Ortho Center.

3.2.4.4 Treatment

The treatment of SHS is foremost conservative with stretching of involved muscles and tendons, physiotherapy, adaptation of activity, NSAIDs and/or intra-lesion injection of corticosteroids [82]. Strength based physiotherapy should apply eccentric exercises as these are shown to reduce pain and stimulate a more normal tendon structure [95]. Treatment of SHS should be initiated when the patient either experiences pain or mechanical symptoms, and not only due to snapping sounds or sensations [86].

SHS can be corrected via both open and arthroscopic intervention. The latter intervention being favourable as it is associated with less post-operative pain, less scarring and fewer complications than open surgery [96].

Surgical techniques when correcting ESHS most often include IT-band Z-plasty shown in figure 13. [97]; or creating a diamond shaped IT-band defect by resection shown in figure 14. [98]. Both procedures may be combined with bursectomy of the affected bursa. Portal placements are 3 cm superior respectively below the greater trochanter with the patient placed in lateral decubitus position [98].



Figure 13. Schematic view of the process of Z-plasty when treating external snapping hip syndrome due to iliotibial-band tightness. *Re-used with permission from SAGE Publications: Provencher et al. The Surgical Treatment of External Coxa Saltans (the Snapping Hip) by Z-Plasty of the Iliotibial Band. The American Journal of Sports Medicine 2004; 32(2); 470–6. DOI: [10.1177/0363546503261713](https://doi.org/10.1177/0363546503261713)*

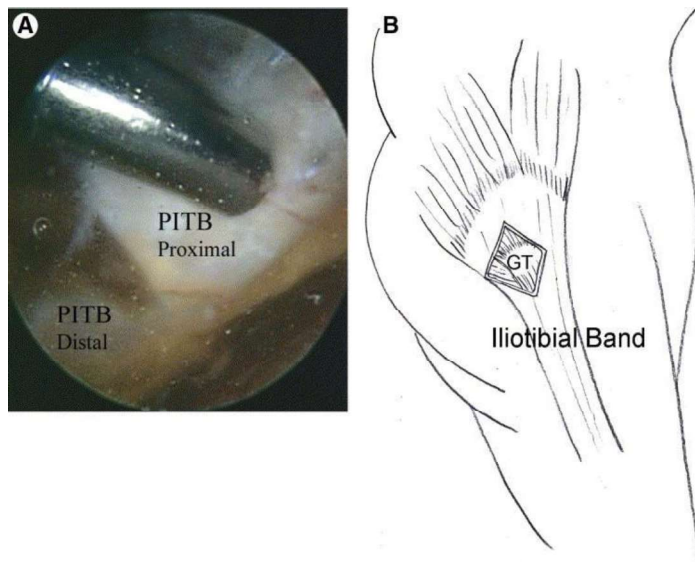


Figure 14. Producing a diamond shaped defect in the iliotibial-band thus exposing the greater trochanter and diminishing the mechanical conflict at this point. A: arthroscopic view. B: schematic view. PITB – Proximal iliotibial-band”. Re- used with permission from Elsevier: Ilizaliturri et al. *Endoscopic Iliotibial Band Release for External Snapping Hip Syndrome. Arthroscopy* 2006; 22(5); 505-10: DOI: [10.1016/j.arthro.2005.12.030](https://doi.org/10.1016/j.arthro.2005.12.030)

Surgical correction of ISHS is achieved by either fractional lengthening or the complete release of the iliopsoas-tendon [99]. Fractional lengthening of the iliopsoas-tendon may be performed via the central compartment by a medial capsulotomy. The lengthening is performed in level with the joint line in the portion consisting of only tendon and no muscles [100]. Complete release is performed at the lesser trochanter and requires that a third portal anterolateral is established [103].

3.2.4.5 Outcome

Both described techniques when dealing with ESHS are adequate, but Z-plasty is associated with mild to moderate abductor weakness, thus not an appropriate alternative when treating athletes [97].

Partial lengthening of the iliopsoas-tendon is associated with 82-91.7% resolution of symptoms [101, 102] and considered equal to complete release of the iliopsoas tendon [104]. Although there are some complications that are more associated to each technique. Partial release is more likely to interact with the femoral nerve due to its closer proximity, while complete release is more associated to hip flexor weakness [104].

4. Method

4.1 Overview

The primary aim of this study is to compare potential outcome differences between the Responders and the Late-responders. The secondary aim is to compare Baseline characteristics.

An update application was approved by the Ethical Committee (D-number: 2019-02990). The update regarded a prior ethical permission to keep the Hip registry that was approved by the local ethical committee in Gothenburg (D-number: 071-12). The main ethical consideration was contacting a group of individuals that potentially have no interest in further participation in the Hip Registry, thus bothering them by establishing contact. Another ethical consideration accessing the patients' journals. Written consent was provided by the Head of Operations at Ortho Center.

This is a prospective non-response study of patients treated with a primary hip arthroscopy at Ortho Center, Gothenburg, during 2015 or 2016. Six different orthopaedic surgeons participated in the procedures. The experience of the surgeon varied, but a lesser experienced surgeon always had an experienced supervisor. The following inclusion criteria were used: 1) Have applied the pre-operative questionnaires 2) Have not responded to the 24-month follow-up 3) 18 years old or above when collecting 24-months PROMs 4) No revision surgery later than 2016 5) No following hip arthroplasty 6) Accepted to participate in the study 7) Being able to fill in the questionnaires during the collection of data. Criteria no. 2 does not apply to the control group, composing of the response group.

4.2 Collecting data

The patients amongst the Late responders were mainly contacted by phone, when there was no success in establishing contact an e-mail was sent to the patients. The e-mail encouraged the patients to participate in the study and provided a link to the online questionnaires. All participants performed the survey online. The collection of data was performed during July 2019.

Prior to attempting to establish contact with the sample (late-responders) they were selected by comparing the pre-operative PROMs with the 24-months PROMs. Those missing in the 24-

months follow-up were then controlled in the journals at Ortho Center, thus ensuring that they fit the study's criteria. The same procedure was applied to the control group.

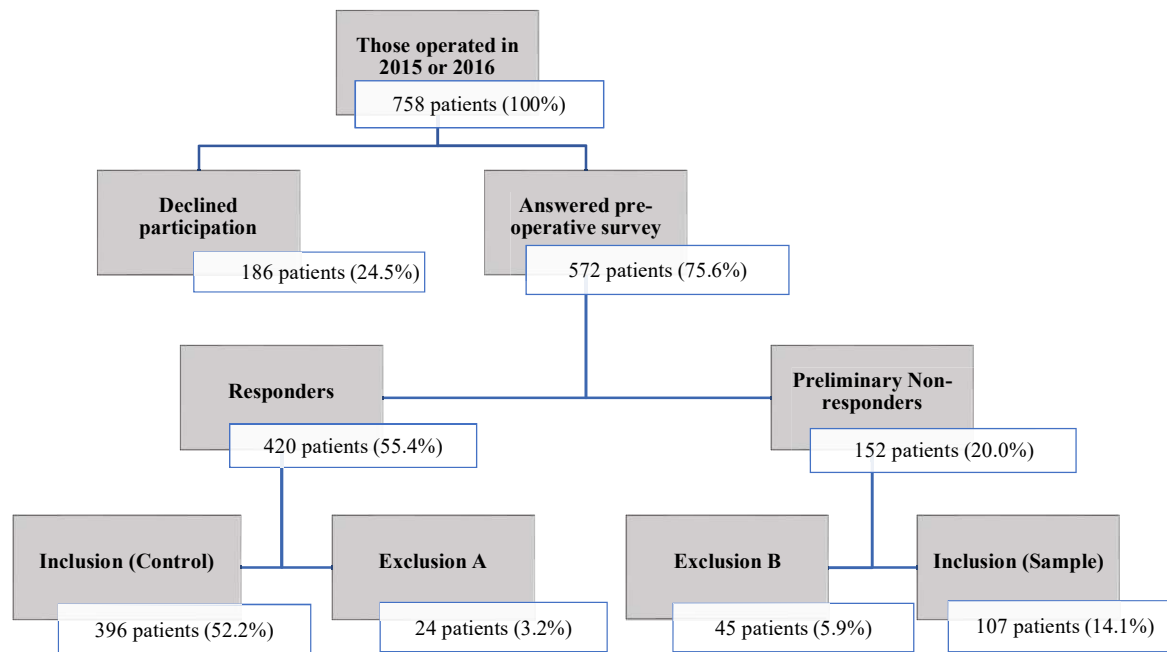


Figure 15. Flow chart illustrating the selection process, thus creating the sample respectively control. The first exclusion depended on whether or not they had responded to the pre-operative surgery or not. The second exclusion amongst the Responders was mainly due to either previous or subsequent hip surgery. While the second exclusion amongst the preliminary Non-responders was mainly due to either being able to establish contact or subsequent hip surgery.

Table 1. Exclusion A & B

Cause leading to exclusion	Response no. (%)	Prel. Non-Response no. (%)
Subsequent Hip Surgery	12 (2.9)	12 (7.9)
Prior Hip Surgery	11 (2.6)	0
Failed to respond to questionnaires	NA	10 (6.6)
Not able to establish contact	NA	15 (9.9)
Other	1 (0.2)	8 (5.3)

Presenting the top causes leading to exclusion, not including patients not responding to the pre-operative surgery. 'Other' include rare causes leading to exclusion. The not applicable (NA) for the Response group are due if they were to fall under that category, then they would have qualified for the Preliminary Non-response group. Percentage is based on the Response respectively Preliminary Non-Response group.

The PROMs included in this study are HAGOS, HSAS, iHOT-12, ED-5Q-5L, a VAS regarding overall hip function and a global assessment regarding satisfaction with the procedure. The following demographics were agreed upon: 1) Diagnosis at the time of surgery 2) Intra-

operative findings of chondral lesions 3) Age 4) Gender 5) Body Mass Index (BMI) 6) Duration of hip symptoms. These were collected via the operative sheets that the surgeon fills in upon completion of surgery.

4.3 Statistical analysis

There were some cases of mismatch when comparing pre- and post-operative PROMs. This was either due to patients misinterpreting the instructions and filling in one questionnaire for each hip when being bilaterally operated, or failure to fully complete both or either of the surveys. Upon mismatch between the number of pre- and post-operative surveys the fewer one was duplicated and matched with corresponding follow-up. There were some exclusions of individual PROMs when there was partly missing data in either the pre- or post-operative questionnaires. This exclusion was due to investigating the change in PROMs, which should be better represented by this method.

Statistical analysis for baseline characteristics. The following results were calculated by a statistical advisor using Statistical Analysis System version 9.1 for windows. For comparison between groups Fisher's Exact test (lowest 1-sided p-value multiplied by 2) was used for most dichotomous variables and the Fisher's Non-Parametric Permutation Test was used for most continuous variables. The confidence intervals for dichotomous variables are the unconditional exact confidence limits. If no exact limits could be computed, then the asymptotic Wald confidence limits with continuity correction was calculated instead. The confidence interval for the mean difference between groups is based on Fisher's non-parametric permutation test.

Statistical analysis for outcome measures. The following results were calculated by a statistical advisor using Statistical Analysis System version 9.1 for windows. When comparing the outcomes between the two groups Fisher's Exact test (lowest 1-sided p-value multiplied by 2) was used for dichotomous variables and the Fisher's Non-Parametric Permutation Test was used for continuous variables. The confidence interval for dichotomous variables is the unconditional exact confidence limits. If no exact limits could be computed the asymptotic Wald confidence limits with continuity correction were calculated instead. The confidence interval for the mean difference between groups is based on Fishers non-parametric permutation test.

The following results were calculated by a student using IBM SPSS 25 for windows. Chi-square was used when comparing HSAS. Fisher’s exact test was used when comparing the means Chondral lesions respectively Pathologies at surgery. The confidence intervals for the Chondral lesions respectively Pathologies at surgery were determined using Clopper-Pearson’s exact method. The confidence intervals for HSAS were provided by the function ‘Descriptive statistics’ in IBM SPSS 25.

A *p*-value of 0.05 or less is deemed significant.

5. Results

5.1 Follow-up

Table 6. Outcome in PROMs

PROM	N	Mean Diff.	95% CI	<i>p</i>-value
HAGOS - S	389, 100	-0.575	-5.248, 3.938	0.77
HAGOS - P	382, 107	-0.787	-5.407, 3.810	0.74
HAGOS – DL	382, 106	0.518	-4.797, 5.512	0.84
HAGOS - Sp	381, 106	-5.53	-11.46, 0.50	0.06
HAGOS - PA	379, 106	-3.72	-11.56, 4.34	0.37
HAGOS - QoL	379, 106	-1.87	-7.66, 3.80	0.54
EQ-5D	379, 106	1.09	-5.68, 8.24	0.72
EQ – VAS	378, 106	1.25	-3.31, 5.60	0.56
iHOT-12	374, 100	2.43	-7.66, 2.74	0.36
Hip – VAS	374, 103	2.13	-3.40, 7.79	0.46
Sat. with Op.	379, 105	-16.5	-26.6, -6.4	<0.05*

Hip and Groin Outcome Score (HAGOS); Symptoms (S); Pain (P); Daily living (DL); Sports (Sp); Physical Activity (PA); Quality of Life (QoL); Visual analogue scale (VAS); Satisfied (Sat.); Operation (Op.); International Hip Outcome Tool-12 (iHOT-12); Number (N); Difference (Diff.); Confidence interval (CI); Patient reported outcome measure (PROM); EQ (European Quality of life). Fisher’s Exact test (lowest 1-sided *p*-value multiplied by 2) was used for dichotomous variables and the Fisher’s Non Parametric Permutation Test was used for continuous variables. The confidence interval for dichotomous variables is the unconditional exact confidence limits. If no exact limits could be computed the asymptotic Wald confidence limits with continuity correction were calculated instead. The confidence interval for the mean difference between groups is based on Fishers non-parametric permutation test.

* = significant.

The mean Follow-up was 24.73 months [95% CI: 24.50, 24.96] for the Responders and 42.50 months [95% CI: 40.63, 43.15] for the Late Responders. As seen in Table 6. there are

comparable outcomes at follow-up when comparing the scores. However, the Late responders were less satisfied with their operation at Ortho Center. The confidence interval for the outcome ‘Satisfied with operation’ is negative while all other confidence intervals spans beyond zero.

5.2 Baseline Characteristics

	N	Mean	95% CI	<i>p-value</i>
Age at op. (years)	396, 107	4.10	1.51, 7.12	<i><0.05*</i>
Women (%)	396, 107	8.7	-1.1, 18.5	<i>0.10</i>
Height (m)	393, 105	-0.428	2.512, 1.554	<i>0.63</i>
Weight (kg)	393, 105	-1.86	-4.93, 1.03	<i>0.22</i>
BMI (kg/m²)	393, 105	-0.489	-1.183, 0.198	<i>0.18</i>
Bilateral op. (%)	393, 106	-9.4	-20.7, 1.8	<i>0.10</i>
Symptom duration (months)	364, 100	5.46	-9.74, 22.46	<i>0.53</i>

Operation – Op; Confidence interval – CI; BMI – Body mass index. A positive value indicates a greater mean amongst the Response group. For comparison between groups Fisher’s Exact test (lowest 1-sided p-value multiplied by 2) was used for dichotomous variables and the Fisher’s Non-Parametric Permutation Test was used for most continuous variables. The confidence interval for dichotomous variables is the unconditional exact confidence limits. If no exact limits could be computed the asymptotic Wald confidence limits with continuity correction was calculated instead. The confidence interval for the mean difference between groups is based on based on Fisher’s non-parametric permutation test. * = significant.

As seen in Table 2, there is only one significant difference amongst the general baseline characteristics between the Responders and Late responders, which is age. This finding is solidified by a positive 95% CI.

Table 3. HSAS at baseline

	N	Responders mean (95% CI)	Late Responders mean (95% CI)	<i>p-value</i>
HSAS-Now	374, 103	2.84 (2.62, 3.07)	2.97 (2.52, 3.42)	0.78
HSAS-Before	374, 103	5.40 (5.21, 5.49)	5.92 (5.53, 6.32)	<0.05*
HSAS-Young	374, 103	5.80 (5.61, 5.99)	6.42 (6.08, 6.76)	<0.05*

Hip Sports Activity Scale (HSAS). Possible scores are 0-8. * = significant. Significance was tested using Chi-square. The confidence intervals for HSAS were calculated using descriptive statistics in International business machines statistical package for social sciences 25.

Table 3. compares HSAS at baseline. Note that there was not a significant difference prior to surgery, while there were significant differences in the two groups level of activity before symptom onset and when the patients were young. However, the 95% CIs for the Late responders were rather wide which suggests that the effect size is rather moderate. Also note that the 95% CIs does not overlap for HSAS-Before and young, which further solidifies that these findings are significant. This finding proposes that the a more active population is more inclined to be lost to follow-up.

Table 4. Hip Pathologies at Baseline

Diagnosis	Responders % (95% CI)	Late Responders % (95% CI)	<i>p-value</i>
CAM	23.6 (20.1, 27.4)	29.1 (22.2, 36.9)	0.17
Pincer	2.0 (1.0, 3.6)	1.3 (0.2, 4.5)	0.74
CPD	68.1 (64.0, 72.0)	63.3 (55.3, 70.8)	0.29
Internal Snapping Hip	0.6 (0.1, 1.6)	0.0 (0.0, 2.3)	1.00
External Snapping Hip	2.0 (1.0, 3.6)	1.9 (0.4, 5.4)	1.00
Labrum Lesion	6.8 (4.8, 9.3)	4.4 (1.8, 8.9)	0.35
Osteoarthritis	9.9 (7.6, 12.8)	8.2 (4.5, 13.7)	0.65
Other	2.2 (1.1, 3.8)	4.4 (1.8, 8.9)	0.40

No missing values. Showing the percentage of hips with a certain diagnosis in each group. Examples of diagnoses included in the category 'Other': intra-articular free body, cysts, teres rupture and chondromatosis. CAM-pincer-deformity (CPD). Clopper-Pearson's exact method was used to determine the 95% confidence intervals (CI). Fisher's exact method was used to determine level of significance. * = significant.

There were no significant differences in Hip pathologies at baseline. This is further supported by overlap amongst all confidence intervals. The vast majority compromises of FAIS-patients with CAM and/or pincer, which also could have concurring hip pathologies. Other included

pathologies are rather rare in this study group, consequently leading to construction of the group ‘Other’.

Table 5. Intra-Operative Findings of Cartilage Lesions at Baseline

Konan	Responders	Late Responders	<i>p-value</i>
	% (95% CI)	% (95% CI)	
0	10.5 (8.0, 13.4)	11.4 (6.9, 17.4)	<i>0.77</i>
1a	9.4 (7.1, 12.2)	8.9 (4.9, 14.4)	<i>1.00</i>
1b	1.7 (0.8, 3.1)	5.1 (2.2, 9.7)	<i><0.05*</i>
1c	0.4 (0.0, 1.3)	0.0 (0.0, 2.3)	<i>1.00</i>
2	19.7 (16.4, 23.3)	25.9 (19.3, 33.5)	<i>0.10</i>
3a	23.4 (19.9, 27.2)	22.8 (16.5, 30.1)	<i>0.92</i>
3b	5.0 (3.3, 7.2)	3.2 (1.0, 7.2)	<i>0.40</i>
3c	0.7 (0.2, 1.9)	0.0 (0.0, 2.3)	<i>0.58</i>
4a	8.1 (5.9, 10.7)	9.5 (5.4, 15.2)	<i>0.63</i>
4b	2.8 (1.6, 4.5)	1.3 (0.2, 4.5)	<i>0.39</i>
4c	0.7 (0.2, 1.9)	0.0 (0.0, 2.3)	<i>0.58</i>

Percentage of hips with certain types of cartilage lesions. Missing values: 136 (25.0%) hips amongst Responders and 31 (19.7%) hips amongst Late Responders. The missing values are either due to hips being difficult to partly distract; not necessary to evaluate the central compartment; or due to lack of data in hip protocols. Clopper-Pearson’s exact method was used to determine the 95% confidence intervals (CI). Fisher’s exact method was used to determine level of significance. * = significant.

Table 5. shows the intra-operative findings of cartilage lesions, graded according to Konan’s grading scale of acetabular cartilage lesions. There is a rather noticeable number of missing values (136 hips, 25%), with an unknown impact on the results. However, the two groups are rather comparable in terms of cartilage status at baseline with one exception. The Late responders were more likely to suffer from Konan 1b lesions than the Responders. Please note that the confidence intervals for Konan 1b lesions overlap, which sheds great uncertainty on the significance test.

6. Discussion

The principal findings of this study suggest that the Gothenburg Hip Registry is not exposed to major confounders, as the Late responders have similar outcomes and baseline characteristics as the Responders. A grand total of 40 variables were assessed, whereas only 5 differences were deemed significant.

The Gothenburg Hip Registry have been providing researchers with data since 2011, and there have not been any attempts to study the potential effects of Loss to follow-up until now. It is only proper to perform a Non-response study as all of the registry's PROMs either have been or currently being tested for validity, responsiveness and reliability. Thus, ensuring appropriate data for research and further development of our knowledge surrounding hip disorders treated with Hip arthroscopy.

This study did find some significant differences in baseline characteristics. The mean age amongst the Late Responders were lower than amongst the Responders. A younger patient is associated with less damage to the articular cartilage, which is associated with superior outcome following Hip Arthroscopy when compared with those with more severe cartilage defect [105]. The effect of this association seems to have been nullified as Table 5. demonstrates that the Late Responders were more likely to have a cartilage defect at baseline. The association between age and loss to follow-up is consistent with other studies [7, 107, 108, 109]

Another significant difference was that the Late Responders were less satisfied with their operation, as seen in Table 6. Possible reasons could be due to frustration of the researchers contacting them; data dredging; dissatisfaction with peri-operative care; sample error; or unrealistic expectations on the surgical intervention. All stated reasons could be true to some extent. Sun et al. found an association between Patient satisfaction and age [115], which could explain why the slightly younger Late responders were less satisfied with their procedure. However, this study also suggest that the Late Responders were more engaged in physical activity before onset of symptoms, while finding no difference in physical activity at follow-up. This could be that the Late Responders benefitted less in terms of relative physical activity. Thus, possibly being more inclined to being less satisfied with their result. Nho et al. studied return to sports amongst a mixture of athletes undergoing Hip arthroscopy following FAI-syndrome. The study reported a 79% return to sports with a minimum follow-up of 1 year [106].

However, the concept of return to sports is somewhat vague and does not necessarily mean that the performance at follow-up is comparable to that before symptom-onset or even provide adequate performance. The retrospective domains of HSAS are of uncertain clinical value as the CIs are rather broad, with the possibility of the Late responders being quite different from the Responders.

The impact of the significant differences could prevent a proper analysis of younger athletes with type 1b cartilage lesions, as these patients have a higher tendency to be lost to follow-up. A concern of unknown magnitude that might distort studies of return to sports as active patients seem inclined to drop out, while also distorting overall studies of Hip arthroscopy as it is fundamentally a Hip preserving intervention. Dwyer et al. has found associations between intra-operative findings of both acetabular and femoral cartilage lesions and subsequent THA at their 20-year follow-up [110].

7. Limitations

This study suffers from some limitations. Firstly, the Late responders differed from how we contacted the Responders. The Responders were only contacted by e-mail, while the Late responders were contacted through a mixture of phone calls, text messages and lastly e-mails. The implications of this methodological difference are unknown and has to the authors knowledge not been studied.

Due to ethical reasons, the 25.1% that initially declined participation in the Hip registry was not contacted as the patient is not to feel pressured into participating once they have declined. This is a major issue as all aspects surrounding these patients will remain unknown. The proportion of non-participants is possibly significant and plausible to influence studies as 20% loss to follow-up coexisting with follow-up bias is associated to underestimation of oddsratios [4].

This study examines the Late responders at a rather late stage, as there is a difference of 17 months in follow-up. This is a major flaw in the study design. A more appropriate approach would have been to contact the Late Responders 1 month following the last routine reminder was sent to the patient. Thus, minimizing differences in follow-up and consequentially making the two groups more comparable. However, Joseph et al. suggest that the post-operative improvement following FAIS-correction is non-existent when comparing the 12-months outcomes to outcomes at 24-months [112]. However, it is possible that a negative trend follows the period of improvement. If so, then the outcomes at the Late Responders 42.50-months follow-up is not comparable to the actual 24-months follow-up.

Although this study includes objective data at baseline, there are none at follow-up. Intra-operative data of cartilage lesions are a valuable parameter in this study as it is considered the gold standard for detecting cartilage lesions in the hip [47, 55]. However, it is not possible to perform arthroscopy at follow-up to detect potential cartilage lesions, limiting the value of this baseline data. A more favourable method would have been an MRI using dGEMRIC as it is a relatively non-invasive method for evaluating the cartilage in the hip. This study is limited by only using subjective parameters at follow-up, while the HSAS subsections evaluating Hip activity when young and before symptom onset also suffers from recall bias. The article by Öhlin et al. did not validate HSAS for retrospective use, but rather for cross-sectional [111].

There is also a risk that this study is under-powered, this is due to us calculating the sample size for detecting a significant mean difference of average size for iHOT-12. The proper way is to calculate the necessary sample sizes for all outcomes and select a sample size that provide sufficient power to all outcomes.

8. Conclusion

There is no outcome difference when comparing the Late responders to the Responders at follow-up. However, the secondary outcomes suggest that the Late responders might differ in baseline characteristics regarding age, physical activity and chondral status, while being less satisfied with their surgery.

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10. Resources

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11. Appendices

11.1 Patient Reported Outcome Measures

11.1.1 Hip Sports Activity Scale

Höft sport aktivitets skala (HSAS)

Uppskatta din aktivitetsnivå vid olika tidpunkter enligt skalan nedan. Fyll i den siffra som stämmer bäst.

Uppskatta din nuvarande aktivitetsnivå (oavsett om du är opererad eller inte)(0-8)

Uppskatta din aktivitetsnivå som den var innan du fick symtom från höften(0-8)

Uppskatta din aktivitetsnivå som den var i yngre tonåren (10-15 års ålder).....(0-8)

8	Tävlingsidrott (<i>Nationell och internationell elitnivå</i>) Fotboll, ishockey, innebandy, kampsport, tennis, friidrott, inomhusbollsporter, beach-vollyboll
7	Tävlingsidrott (<i>Nationell och internationell elitnivå</i>) Utförsåkning, snowboard, konståkning, hastighetsåkning med skridskor, danssporter Tävlingsidrott (<i>Lägre divisioner</i>) Fotboll, ishockey, innebandy, kampsport, tennis, friidrott, inomhusbollsporter, beach-vollyboll
6	Tävlingsidrott (<i>Nationell och internationell elitnivå</i>) Golf, tävlingscykling, mountainbike, simning, tävlingsrodd, långdistanslöpning/biathlon, ridning Tävlingsidrott (<i>Lägre nivå</i>) Utförsåkning, snowboard, konståkning, hastighetsåkning med skridskor, danssporter
5	Tävlingsidrott (<i>Lägre nivå</i>) Golf, cykling, mountainbike, simning, tävlingsrodd, långdistanslöpning/biathlon Motionsidrott Ishockey, innebandy, kampsport, fotboll, friidrott, beach-volleyboll
4	Motionsidrott

Tennis, utförsåkning, snowboard, inomhusbollsporter

3 Motionsidrott

Aerobics, joggning, styrketräning av nedre extremiteterna, ridning

2 Motionsidrott

Tävlingscykling, mountainbike, långdistanslöpning, långfärdsskridskor, golf,
Dans, inlines åkning

1 Motionsidrott

Simning, cykling, promenader, stavgång

0 Inget deltagande i motions- eller tävlingsidrott

Asterix, inomhusbollsporter: exempelvis squash, badminton, basketboll,
volleyboll, promenader

11.1.2 Satisfied with operation

Skulle du göra om operationen om du var i samma situation igen?

- Ja
- Nej
- Ej opererad

11.1.3 The international Hip Outcome Tool 12

FORMULÄR OM LIVSKVALITÉ HOS UNGA AKTIVA MÄNNISKOR MED HÖFTPROBLEM

INSTRUKTIONER

- Dessa frågor handlar om de besvär som du kan uppleva i din höft, hur dessa besvär påverkar ditt liv och de känslor du känner som följd av dessa besvär.
- Vänligen ange svårighetsgraden av dina höftbesvär genom att markera linjen med ett streck nedanför varje fråga

- » Om du markerar längst ut till vänster betyder det att du känner dig påtagligt begränsad.
Till exempel:

PÅTAGLIGT /----- INGA PROBLEM
BEGRÄNSAD ALLS

- » Om du markerar längst ut till höger betyder det att du inte har några problem alls med din höft.
Till exempel:

PÅTAGLIGT ----- / INGA PROBLEM
BEGRÄNSAD ALLS

- » Om markeringen placeras mitt på linjen betyder det att du är måttligt besvärad, eller med andra ord, mitt emellan 'påtagligt begränsad' och 'inga problem alls'. Det är viktigt att du markerar ända ut i kanten av linjen om det är ytterligheten som bäst beskriver din situation.

TIPS Om du inte utför en aktivitet, föreställ dig hur det skulle kännas i din höft om du var tvungen att utföra aktiviteten.

- Vänligen låt dina svar beskriva den typiska situationen senaste månaden.

F1 Totalt sett, hur mycket smärta har du i din höft/ljumske?

EXTREMT SMÄRTA ----- INGEN SMÄRTA
ALLS

F2 Hur svårt är det för dig att ta dig ner på och upp från golvet/marken?

EXTREMT SVÅRT ----- INTE SVÅRT
ALLS

F3 Hur svårt är det för dig att gå långa distanser?

EXTREMT SVÅRT ----- INTE SVÅRT
ALLS

F4 Hur mycket besvär har du av krasningar, upphakningar eller klickande i din höft?

PÅTAGLIGA BESVÄR _____ INGA BESVÄR ALLS

F5 Hur mycket besvär har du av att knuffa, dra, lyfta eller bära tunga föremål?

PÅTAGLIGA BESVÄR _____ INGA BESVÄR ALLS

F6 Hur oroad är du över riktningförändringar när du idrottar eller motionerar?

EXTREMT OROAD _____ INTE OROAD ALLS

F7 Hur mycket smärta har du i din höft *efter* aktivitet?

EXTREMT SMÄRTA _____ INGEN SMÄRTA ALLS

F8 Hur oroad är du över att lyfta upp och bära barn på grund av din höft?

EXTREMT OROAD _____ INTE OROAD ALLS

F9 Hur mycket besvär har du med sexuella aktiviteter på grund av din höft?

Detta är inte relevant för mig

PÅTAGLIGA BESVÄR _____ INGA BESVÄR ALLS

F10 Hur mycket tid är du medveten om dina besvär med din höft?

KONSTANT MEDVETEN _____ INTE MEDVETEN ALLS

F11 Hur oroad är du över din möjlighet att upprätthålla din önskade fysiska nivå?

EXTREMT OROAD _____ INTE OROAD ALLS

F12 Hur distraherande/störande är dina höftproblem?

EXTREMT DISTRAHERANDE/
STÖRANDE _____ INTE ALLS
DISTRAHERANDE/
STÖRANDE

11.1.4 Copenhagen Hip and Groin Outcome Scale

The Copenhagen Hip and Groin Outcome Score (HAGOS). Svensk version 1.0.

HAGOS

Frågeformulär om höft- och/eller lumskeproblem

Datum: _____ CPR nr: _____

Namn: _____

VÄGLEDNING: Detta frågeformulär innehåller frågor om hur din höft och/eller lumske fungerar. Du skall ange hur din höft och/eller lumske har fungerat under **den senaste veckan**. Svaren skall hjälpa oss att kunna förstå hur du har det och hur bra du klarar dig i vardagen.

Du skall besvara frågorna genom att kryssa för det alternativ som passar dig bäst. Du skall endast ange ett kryss för varje fråga. Du skall svara på alla frågorna. Om en fråga inte gäller dig eller om du inte upplevt besväret under den senaste veckan, så ange det alternativ som passar bäst in och som du känner dig mest nöjd med.

Symptom

Tänk på de **symptom** och besvär du har haft i din höft och/eller lumske under **den senaste veckan** när du svarar på följande frågor.

- S1 Har du malande/obehag i höften och/eller lumsken?
Aldrig Sällan Ibland Ofta Alltid
- S2 Har du hört klickande eller andra ljud från höften och/eller lumsken?
Aldrig Sällan Ibland Ofta Hela tiden
- S3 Har du problem med att få benen långt ut åt sidan?
Inga Lite Måttliga Stora Mycket stora
- S4 Har du problem med att ta steget fullt ut när du går?
Inga Lite Måttliga Stora Mycket stora
- S5 Får du plötsliga stickande/pirrande förmimmelser i höften och/eller lumsken?
Aldrig Sällan Ibland Ofta Hela tiden

1

Översatt och kulturpassat till svenska av Roland Thomeé*, Páll Sigurgeir Jonasson*, Mikael Sansone*, Kristian Thorborg* och Jon Karlsson*.
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e-mail: roland.thomee@orthop.gu.se

Stelhet

Följande frågor handlar om **stelhet i höften och/eller ljumsken**. Stelhet medför besvär att komma igång eller ett ökat motstånd när du böjer höften och/eller ljumsken. **Ange i hur stor grad du har upplevt stelhet i höften och/eller ljumsken under den senaste veckan.**

S6 Hur stel är du i din höft och/eller ljumske när du just har vaknat på morgonen?
Inte alls Lite Måttligt Mycket Extremt

S7 Hur stel är du i din höft och/eller ljumske senare på dagen, efter att du har suttit eller legat och vilat dig?
Inte alls Lite Måttligt Mycket Extremt

Smärtor

P1 Hur ofta har du ont i höften och/eller ljumsken?
Aldrig Varje månad Varje vecka Varje dag Alltid

P2 Hur ofta har du ont på andra ställen än i höften och/eller ljumsken som du tycker hänger ihop med dina höft- och/eller ljumskproblem?
Aldrig Varje månad Varje vecka Varje dag Alltid

Följande frågor handlar om hur ofta du haft smärta i höften och/eller ljumsken under **den senaste veckan**. **Ange graden av höft- och/eller ljumsksmärta du har upplevt i följande situationer.**

P3 Sträcka ut höften helt och hållet
Ingen Lätt Måttlig Svår Mycket svår

P4 Böja höften helt och hållet
Ingen Lätt Måttlig Svår Mycket svår

P5 Gå upp- eller nedför trappor
Ingen Lätt Måttlig Svår Mycket svår

P6 Om natten när du ligger ned (smärtor som förstör din sömn)
Ingen Lätt Måttlig Svår Mycket svår

P7 Sitta eller ligga
Ingen Lätt Måttlig Svår Mycket svår

2

Följande frågor handlar om hur ofta du har haft smärta i höften och/eller lumsken under **den senaste veckan**. Ange graden av höft- och/eller lumsksmärta du har upplevt i följande situationer.

- P8 Stående
Ingen Lätt Måttlig Svår Mycket svår
- P9 Gå på hårt underlag, på asfalt eller sten
Ingen Lätt Måttlig Svår Mycket svår
- P10 Gå på ojämnt underlag
Ingen Lätt Måttlig Svår Mycket svår

Fysisk funktion, dagliga aktiviteter

Följande frågor handlar om din fysiska funktion. Ange graden av besvär du har haft i följande situationer under den senaste veckan, på grund av din höft och/eller lumske.

- A1 Gå uppför trappor
Inga Lätta Måttliga Stora Mycket stora
- A2 Böja dig ner, tex för att plocka upp något från golvet
Inga Lätta Måttliga Stora Mycket stora
- A3 Kliva i/ur bil
Inga Lätta Måttliga Stora Mycket stora
- A4 Ligga i sängen (vända dig eller hålla höften i samma läge under lång tid)
Inga Lätta Måttliga Stora Mycket stora
- A5 Utföra tungt hushållsarbete (tvätta golv, dammsuga, bära drickabackar och liknande)
Inga Lätta Måttliga Stora Mycket stora

Funktion, sport och fritid

Följande frågor handlar om din fysiska förmåga. Du skall svara på ALLA frågor. Om en fråga inte gäller dig eller om du inte upplevt besväret under den senaste veckan, så ange det alternativ som passar bäst in och som du känner dig mest nöjd med. **Ange vilken grad av besvär du har haft i följande aktiviteter under den senaste veckan, på grund av problem med din höft och/eller ljumske.**

SP1 Sitta på huk

Inga Lätta Måttliga Stora Mycket stora

SP2 Springa

Inga Lätta Måttliga Stora Mycket stora

SP3 Vrida/snurra kroppen när du står på benet

Inga Lätta Måttliga Stora Mycket stora

SP4 Gå på ojämnt underlag

Inga Lätta Måttliga Stora Mycket stora

SP5 Springa så snabbt du kan

Inga Lätta Måttliga Stora Mycket stora

SP6 Föra benet framåt kraftigt och/eller till sidan, exempelvis som vid en spark, skridskosteg eller liknande

Inga Lätta Måttliga Stora Mycket stora

SP7 Plötsliga, explosiva rörelser som involverar snabba fotrörelser, exempelvis accelerationer, uppbromsningar, riktningförändringar eller liknande

Inga Lätta Måttliga Stora Mycket stora

SP8 Situationer där benet rör sig helt ut i ytterläge (med ytterläge menas så långt ut från kroppen som möjligt)

Inga Lätta Måttliga Stora Mycket stora

Delta i fysisk aktivitet

Följande frågor handlar om din förmåga att delta i fysiska aktiviteter. Med fysiska aktiviteter menas idrottsaktiviteter, men även andra aktiviteter, där man blir lätt andfådd. Ange i vilken grad din förmåga att delta i önskade fysiska aktiviteter har varit påverkade under senaste veckan, på grund av dina problem med din höft och/eller lumske.

PA1 Kan du delta i önskade fysiska aktiviteter så länge du vill?

Alltid Ofta Ibland Sällan Aldrig

PA2 Kan du delta i önskade fysiska aktiviteter på din normala prestationsnivå?

Alltid Ofta Ibland Sällan Aldrig

Livskvalitet

Q1 Hur ofta blir du påmind om dina problem med höften och/eller lumsken?

Aldrig Varje månad Varje vecka Varje dag Alltid

Q2 Har du ändrat ditt sätt att leva för att undgå att påfresta höften och/eller lumsken?

Inget alls Något Måttligt I stor utsträckning Totalt

Q3 Hur stora problem har du generellt med din höft och/eller lumske?

Inga Lätta Måttliga Stora Mycket stora

Q4 Påverkar dina problem med höften och/eller lumsken ditt humör i en negativ riktning?

Aldrig Sällan Ibland Ofta Alltid

Q5 Känner du dig begränsad p.g.a. problem med din höft och/eller lumske?

Aldrig Sällan Ibland Ofta Alltid

Tack för att du har besvarat Alla frågorna!

11.1.5 Hip-VAS

Höftenkät

Hur skulle du skatta din höftfunktion på en skala 0 - 100?

0 = extremt dålig funktion och 100 = perfekt funktion.

11.1.6 EQ5D-5L

Kryssa under varje rubrik bara i EN ruta som bäst beskriver din hälsa IDAG.

RÖRLIGHET

- Jag har inga svårigheter med att gå omkring
- Jag har lite svårigheter med att gå omkring
- Jag har måttliga svårigheter med att gå omkring
- Jag har stora svårigheter med att gå omkring
- Jag kan inte gå omkring

PERSONLIG VÅRD

- Jag har inga svårigheter med att tvätta mig eller klä mig
- Jag har lite svårigheter med att tvätta mig eller klä mig
- Jag har måttliga svårigheter med att tvätta mig eller klä mig
- Jag har stora svårigheter med att tvätta mig eller klä mig
- Jag kan inte tvätta mig eller klä mig

VANLIGA AKTIVITETER (t ex arbete, studier, hushållssysslor, familje- eller fritidsaktiviteter)

- Jag har inga svårigheter med att utföra mina vanliga aktiviteter
- Jag har lite svårigheter med att utföra mina vanliga aktiviteter
- Jag har måttliga svårigheter med att utföra mina vanliga aktiviteter
- Jag har stora svårigheter med att utföra mina vanliga aktiviteter
- Jag kan inte utföra mina vanliga aktiviteter

SMÄRTOR/BESVÄR

- Jag har varken smärtor eller besvär
- Jag har lätta smärtor eller besvär
- Jag har måttliga smärtor eller besvär
- Jag har svåra smärtor eller besvär
- Jag har extrema smärtor eller besvär

ORO/NEDSTÄMDHET

- Jag är varken orolig eller nedstämd
- Jag är lite orolig eller nedstämd
- Jag är ganska orolig eller nedstämd
- Jag är mycket orolig eller nedstämd
- Jag är extremt orolig eller nedstämd

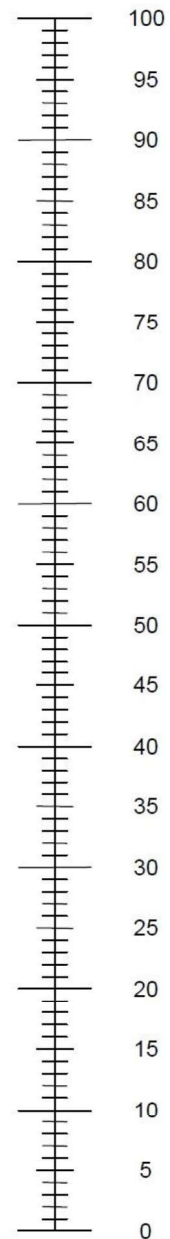
2

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- Vi vill veta hur bra eller dålig din hälsa är IDAG.
- Den här skalan är numrerad från 0 till 100.
- 100 är den bästa hälsa du kan tänka dig.
0 är den sämsta hälsa du kan tänka dig.
- Sätt ett X på skalan för att visa hur din hälsa är IDAG.
- Skriv nu i rutan nedan det nummer du har markerat på skalan.

DIN HÄLSA IDAG =

Bästa hälsa du kan
tänka dig



Sämsta hälsa du
kan tänka dig

11.2 Sample Correspondence

Hej!

Vi är mycket tacksamma om du kan ta dig tid och fylla i enkäten då den är ett viktigt redskap i vårt fortlöpande forsknings- och kvalitetsarbete på kliniken.

Hör gärna av dig om du har några frågor!

Här kommer länken igen.

http://lulab.orthop.gu.se/hoftekat/startside.php?grupp=harald&tidpunkt=24_man

Tack på förhand!

Med vänlig hälsning

11.3 Surgeon reported data

Höftregisterparametrar

Dagens datum

Personnummer

Namn

 Hö Vä

Ev idrott

Symtomduration:

 år mån

Re-operation:

 Ja
 Nej

Diagnos:

- | | | |
|--|--|--|
| <input type="checkbox"/> CAM | <input type="checkbox"/> Teres | <input type="checkbox"/> Intern snapping hip |
| <input type="checkbox"/> Pincer | <input type="checkbox"/> Fri kropp | <input type="checkbox"/> Extern snapping hip |
| <input type="checkbox"/> Mixed | <input type="checkbox"/> Labrumskada | <input type="checkbox"/> Cystor acetabulum |
| <input type="checkbox"/> Chondromatos | <input type="checkbox"/> Artros | <input type="checkbox"/> Cystor caput/collum |
| <input type="checkbox"/> Psoastendinos | <input type="checkbox"/> Annan orsak _____ | |

Broskskada:

Ingen broskskada

Lokal:

ACETABULUM

Orsak:

- Impingement Trauma OA OCD Iatrogen Annat.....

Konans broskklassifikation:

- | | | | | |
|-----------------------------------|--|---|--|--|
| <input type="checkbox"/> 0 Normal | <input type="checkbox"/> 1 Softening
or wave sign | <input type="checkbox"/> 2 Cleavage
lesion | <input type="checkbox"/> 3 Delamination | <input type="checkbox"/> 4 Exposed bone |
| | <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c | | <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c | <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c |

a = < 1/3 av avståndet mellan labrum och fossan.
c = > 2/3 av avståndet mellan labrum och fossan.

b = > 1/3 av avståndet mellan labrum och fossan

Lokal:

CAPUT

Orsak:

Impingement Trauma OA OCD Iatrogen Annat.....

ICRS:

0 Normal 1 Nearly normal 2 Ab-normal 3 Sverely abnormal >50% djup 4 Seveverely abnormal, ned till ben

Åtgärder:

Resektion: CAM Pincer Mediala osteofyter

Labrum: Sutur Debridering Resektion

Psoas: Debridering Tenotomi

Teres: Resektion Debridering

Excision : Fri kropp Lat plica

Mikrofrakturering

Synovektomi

Trochanterburssektomi

Annat

Op-datum Längd..... Vikt.....

Op-tid:.....

Sträcktid:.....

Dagkir: Ja Nej

Avvikelse: Mycket blödning Leden gick ej att se Annat

Komplikationer: beskriv.....

.....

.....

Operatör:.....

Assistent:.....

Övrigt:.....