FEMOROACETABULAR IMPINGEMENT SYNDROME TREATMENT

Policy Number: SURGERY 074.13 T2 **Effective Date**: January 1, 2019

Instructions for Use

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Related Policies
None

CONDITIONS OF COVERAGE

Applicable Lines of Business/Products	This policy applies to Oxford Commercial plan membership.
Benefit Type	General benefits package
Referral Required (Does not apply to non-gatekeeper products)	No
Authorization Required (Precertification always required for inpatient admission)	Yes[1]
Precertification with Medical Director Review Required	Yes[1]
Applicable Site(s) of Service (If site of service is not listed, Medical Director review is required)	Inpatient, Outpatient
Special Considerations	[1]Precertification with review by a Medical Director or their designee is required.

COVERAGE RATIONALE

Surgical treatment for femoroacetabular impingement (FAI) syndrome is proven and medically necessary when the following criteria are met:

- Pain unresponsive to medical management (e.g., restricted activity, nonsteroidal anti-inflammatory drugs)
- Moderate-to-severe symptoms typical of FAI (persistent hip or groin pain that limits activity and is worsened by bending of the joint such as squatting or prolonged sitting)
- Positive impingement sign (i.e., sudden pain on 90 degree hip flexion with adduction and internal rotation or extension and external rotation)
- Imaging studies (X-rays, MRI or CT scans) confirming FAI (e.g., pistol-grip deformity, alpha angle greater than 50 degrees, coxa profunda, and/or acetabular retroversion)
- Do not have advanced osteoarthritis (i.e., Tönnis grade 2 or 3) and/or severe cartilage damage (i.e., Outerbridge grade III or IV)

(Tannast, 2007; Filigenzi, 2008; Zebala, 2007; Clohisy 2010)

DEFINITIONS

Tonnis Classification of Osteoarthritis by Radiographic Changes:
- Grade 0: No signs of osteoarthritis (OA)
- Grade 1: Increased sclerosis of femoral head or acetabulum, slight joint space narrowing or slight slipping of joint margin, no or slight loss of head sphericity
- Grade 2: Small cysts in femoral head or acetabulum, moderate joint space narrowing, moderate loss of head sphericity
- Grade 3: Large cysts, severe joint space narrowing or obliteration of joint space, severe deformity of the head, avascular necrosis

Outerbridge Grades:
- Grade 0: Normal
- Grade I: Cartilage with softening and swelling
- Grade II: Partial-thickness defect with fissures on the surface that do not reach subchondral bone or exceed 1.5 cm in diameter
- Grade III: Fissuring to the level of subchondral bone in an area with a diameter more than 1.5 cm
- Grade IV: Exposed subchondral bone head

APPLICABLE CODES

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies may apply.

CPT Code	Description
27299	Unlisted procedure, pelvis or hip joint
29914	Arthroscopy, hip, surgical; with femoroplasty (i.e., treatment of cam lesion)
29915	Arthroscopy, hip, surgical; with acetabuloplasty (i.e., treatment of pincer lesion)
29916	Arthroscopy, hip, surgical; with labral repair
29999	Unlisted procedure, arthroscopy

Coding Clarification: The specific codes for femoroacetabular impingement syndrome surgery listed above should be used instead of 27299 and/or 29999.

DESCRIPTION OF SERVICES

Femoroacetabular impingement (FAI) occurs due to an altered or suboptimal shape of the femoral neck, leading to repetitive contact between the femoral neck and the tissue around the rim of the hip joint socket. The resulting physical stress can damage tissues, leading to degeneration of the socket rim and tearing of the cartilage that makes up the socket, causing hip pain and limited range of motion (ROM).

Conservative treatments for FAI include rest, modification and limitation of activities, anti-inflammatory medications, physical therapy, and injection of the hip joint with a steroid or analgesic. If these treatments fail to provide adequate relief, hip surgery may be indicated.

Several different types of arthroscopic surgery have been developed to reshape bone and remove or repair damaged cartilage with the goal of restoring normal hip function. (Hayes, 2018)

Three surgical approaches are commonly used to accomplish the goals of surgical intervention; an open approach, arthroscopy or arthroscopy with a limited open approach (mini-open). The appropriate surgical technique depends on the type of impingement, the extent of damage, the labral and cartilage pathology, and the physician/patient preferences and desired outcomes. (Barton, et al., 2009)

Components that may be performed during FAI surgery include but are not limited to:
- Removing the nonspherical sections of the femoral head and prominent sections of the anterior femoral neck (osteoplasty)
- Debridement of chondral lesions
- Labral debridement (resection) or labral repair (refixation or reattachment)

- Evaluation and repair of chondral defects using microfracture or drilling chondroplasty
- Excising bony prominence and reshaping the acetabular rim (NICE, 2011)

CLINICAL EVIDENCE

Minkara et al. (2018) performed a meta-analysis and systematic review to evaluate risk factors and outcomes after arthroscopic management of femoroacetabular impingement (FAI), including return to play, revision rate, surgical and nonsurgical complications, change in α-angle, intraoperative bone resection, and patient-reported. A total of 1981 hips among 1911 patients were identified, with a mean ± SD age of 29.9 ± 1.9 years and 29.5 ± 14.0 months of follow-up. The incidence of bilateral FAI in these studies that required operative intervention was 3.6%. The pooled risk of reoperation after hip arthroscopy, including revision surgery or subsequent total hip arthroplasty, was 5.5%. The risk of clinical complications was 1.7%. In total, 87.7% of patients demonstrated return to sport after surgery and all patient-reported outcomes improved postoperatively, with the highest increase observed in the Hip Outcome Score sports scale (41.7 points). The α-angle decreased by an average of 23.6°. The authors reported that a high percentage of patients return to sport activities after hip arthroscopy for FAI, with a low rate of complications and reoperation. All patient-reported outcome measures, except for mental health, significantly improved after surgery.

Mansell et al. (2018) conducted a randomized controlled trial (n=80) to determine the comparative effectiveness of surgery and physical therapy for femoroacetabular impingement syndrome. The authors randomly selected patients to undergo either arthroscopic hip surgery (surgery group) or physical therapy (rehabilitation group). Patients in the rehabilitation group began a 12-session supervised clinic program within 3 weeks, and patients in the surgery group were scheduled for the next available surgery at a mean of 4 months after enrollment. Patient-reported outcomes of pain, disability, and perception of improvement over a 2-year period were collected. The primary outcome was the Hip Outcome Score (HOS; range, 0-100; 2 subscales: activities of daily living and sport). Secondary measures included the International Hip Outcome Tool (iHOT-33), Global Rating of Change (GRC), and return to work at 2 years. Statistically significant improvements were seen in both groups on the HOS and iHOT-33, but the mean difference was not significant between the groups at 2 years (HOS activities of daily living, 3.8; HOS sport, 1.8; iHOT-33, 6.3). The median GRC across all patients was that they "felt about the same" (GRC = 0). Two patients assigned to the surgery group did not undergo surgery, and 28 patients in the rehabilitation group ended up undergoing surgery. There was no significant difference between the groups at 2 years. Most patients perceived little to no change in status at 2 years. Limitations included a single hospital, a single surgeon, and a high rate of crossover.

Kierkegaard et al. (2017) conducted a systematic review and meta-analysis to investigate pain, activities of daily living (ADL) function, sport function, quality of life and satisfaction at different time points after hip arthroscopy in patients with femoroacetabular impingement (FAI). Weighted mean differences between preoperative and postoperative outcomes were calculated and used for meta-analysis. Twenty-six studies (22 case series, 3 cohort studies, 1 randomized controlled trial (RCT)) were included in the systematic review and 19 in the meta-analysis. ADL function improvements were first reported between 3 and 6 months and maintained through at least 3 years of follow-up. Sport function improvements were noted between 6 months and 1 year after surgery. On average, residual mild pain and ADL and sport function scores lower than their healthy counterparts were reported by patients following surgery. Postoperative patient satisfaction ranged from 68% to 100%.

A 2017 Hayes Medical Technology literature search identified 16 studies published from 2008 through 2016 comparing outcomes for varying forms of arthroscopic surgery for femoroacetabular impingement (FAI). Overall, the study results suggest that arthroscopic surgery for FAI is safe and improves hip function and reduces pain. Other than the evidence base comparing labral resection versus labral debridement, there is limited comparative evidence evaluating variations of arthroscopic surgical techniques or arthroscopic surgery relative to nonoperative management for FAI. Additional well-designed studies with long-term follow-up are needed to address uncertainty concerning the comparative efficacy and safety of arthroscopic surgery versus open surgery, variations of arthroscopic surgical techniques, and arthroscopic surgery relative to nonoperative management for FAI.

An update literature search was performed on May 29, 2018 in PubMed which covers the period of March, 2017 to May, 2018. Three relevant newly published studies on FAI meet the inclusion criteria and did not change the study results.

The purpose of a cohort study (Sansone et al., 2017) was to report outcome 2 years after the arthroscopic treatment of femoroacetabular impingement (FAI) using validated outcome measurements. Two hundred and eighty-nine patients underwent arthroscopic surgery for FAI. The mean follow-up time was 25.4 months. Pre-operative scores compared with those obtained at follow-up revealed statistically and clinically significant improvements for all measured outcomes; International Hip Outcome Tool (iHOT-12) (43 vs 66), visual analog scale (VAS) for global hip function (50 vs 71), Hip Sports Activity Scale (HSAS) (2.9 vs 3.6), EuroQol (EQ-5D) index (0.58 vs 0.75), EuroQol visual analogue scale (EQ-VAS) (67 vs 75) and the Copenhagen Hip and Groin Outcome Score (HAGOS) different subscales (56 vs 76, 51 vs 69, 60 vs 78, 40 vs 65, 29 vs 57, 33 vs 58). At the 2-year follow-up, 236 patients (82%)

reported they were satisfied with the outcome of surgery. The authors concluded that arthroscopic treatment for FAI resulted in statistically and clinically significant improvements in outcome parameters.

Khan et al. (2016) conducted a systematic comprehensive review in duplicate of Arthroscopy and The American Journal of Sports Medicine (AJSM) from February 2012 to February 2015 for all articles related to Femoroacetabular Impingement (FAI). A total of 4,131 patients in 104 studies were included in this review. The modified Harris Hip Score (mHHS) mean values after arthroscopic surgery for FAI showed improvements at the midterm from 60.5 points to 80.5 points out of a possible 100 points. The outcomes for labral repair showed mean mHHS improvements from 63.8 points preoperatively to 86.9 points up to 24 months postoperatively. The authors concluded arthroscopic intervention results in improvements in functional outcomes at both the short-term and midterm for patients with symptomatic FAI in the absence of significant existing degenerative changes. Labral repair may result in improvements over labral debridement. The primary limitation of this study is the potential risk of bias in the findings from restricting this review to two journals. This however was done to allow for a comparison in the quality and content between these publications.

Fairley et al. (2016) conducted a systematic review to examine the evidence for surgical and non-surgical treatment of femoroacetabular impingement syndrome (FAI) on symptom and structural outcomes. Eighteen studies were identified comparing management strategies for FAI but no studies compared surgical and non-surgical treatment. Most studies had a high risk of bias. There was evidence that arthroscopy provided improved symptom outcomes compared to open surgery with labral preservation. There was some evidence that surgical interventions are effective in reducing alpha angle but no long-term outcomes data. The review found weak evidence that surgery was associated with structural progression of hip osteoarthritis. The authors concluded there is a lack of evidence for use of surgery in FAI and clarification of the role of non-surgical approaches vs surgery for the management of FAI is warranted.

A systematic review comparing outcomes of labral debridement/segmental resection with labral reconstruction as part of a comprehensive treatment strategy for femoroacetabular impingement was performed by Forster-Horvath et al. (2016). The study groups were divided into labral debridement/segmental resection (group 1) and labral reconstruction (group 2). Twelve studies explored outcomes after labral debridement/resection in a total of 400 hips and 7 studies reported on outcomes after labral reconstruction in a total of 275 hips. One additional matched-pair control study compared labral resection (22 hips) with reconstruction (11 hips). The surgical intervention was a revision in 0% to 100% for group 1 versus 5% to 55% for group 2. A direct anterior approach was not performed in group 2, and cam-type impingement appeared to make up a larger percentage of group 1. The Tönnis grade ranged from 0 to 1 for group 1 versus 0.3 to 1.1 for group 2. Joint replacements were performed in 0% to 30% and 0% to 25%, respectively. The modified Harris Hip Score suggested that labral reconstruction was not inferior to labral debridement/segmental resection. The authors concluded that clinical outcomes after labral debridement/segmental resection versus labral reconstruction were found to be comparable.

Zhang et al. (2016) conducted a meta-analysis to evaluate the efficacy and safety of hip arthroscopy versus open surgical dislocation for treating femoroacetabular impingement (FAI). Five controlled clinical trials evaluating a total of 352 hips were included. No randomized control trials were found. Compared with open surgical dislocation, hip arthroscopy resulted in significantly higher Nonarthritic Hip Scores (NAHS) at 3- and 12-month follow-ups, a significant improvement in NAHS from preoperation to 3 months postoperation, and a significantly lower reoperation rate. Open surgical dislocation resulted in a significantly improved alpha angle by the Dunn view in patients with cam osteoplasty from preoperation to postoperation, compared with hip arthroscopy. There were no significant differences in the modified Harris Hip Score, Hip Outcome Score-Activities of Daily Living, or Hip Outcome Score-Sport Specific Subscale at 12 months of follow-up, or in complications (including nerve damage, wound infection, and wound dehiscence). The authors concluded that this meta-analysis found that hip arthroscopy resulted in a significantly higher NAHS after 3 and 12 months of follow-up, and a significantly improved NAHS from preoperation to 3 months postoperation, than open surgical dislocation.

Nwachukwu et al. (2015) performed a systematic review and meta-analysis to determine whether there was a significant difference in clinical outcomes and progression to total hip arthroscopy between hip arthroscopy and open surgical hip dislocation treatment for FAI at minimum medium-term follow-up (36 months). They concluded that both hip arthroscopy and open surgical hip dislocation showed excellent and equivalent hip survival rates at 36 months with hip-specific outcome measures, demonstrating equivalence between groups. However, hip arthroscopy was shown to have superior results regarding general health-related quality of life in comparison to open treatment. Further studies are needed through well-conducted clinical trials to assess long-term outcomes for patients with FAI and increase understanding of the natural history of FAI.

Larson et al. (2016) conducted a cohort study which included 77 patients (88 hips). Dysplastic radiographic findings were retrospectively reviewed at a mean follow-up of 26.0 months after hip arthroscopy. Specific procedures included labral repair (76%), labral debridement (23%), capsular repair/plication (82%), and femoral osteochondroplasty

(72%). Pre- and postoperative function were evaluated prospectively with the modified Harris Hip Score (mHHS), 12-Item Short Form Health Survey, and visual analog scale for pain. The results of the dysplastic cohort were compared with a cohort of 231 hips without radiographic dysplasia that underwent arthroscopic Femoroacetabular Impingement (FAI) correction during the study period. At the time of final follow-up, the dysplastic cohort demonstrated a mean mHHS of 81.3 with a mean 15.6-point improvement in mHHS, compared with 88.4 and 24.4 points, respectively, in the FAI cohort. The dysplastic cohort had 60.9% good/excellent results and 32.2% failures, compared with 81.2% good/excellent results and 10.5% failures for the FAI cohort. Failure was defined as a mHHS ≤70 or eventual pelvic/femoral osteotomy or total hip arthroplasty. Dysplastic hips that underwent capsular plication and labral repair had greater good/excellent results (73%) and mean latest mHHS (85), as well as lower failure rates (18%) compared with the remainder of the dysplastic cohort. The authors concluded that arthroscopic management of mild to moderate acetabular dysplasia had inferior good/excellent results and higher failure rates when compared with an FAI cohort; therefore, isolated arthroscopic procedures in this population should be cautiously considered. Labral repair and capsular plication resulted in better clinical outcomes.

Collins et al. (2015) conducted a systematic review of the literature to determine if prophylactic surgical intervention for asymptomatic patients with radiographic evidence of FAI is warranted to prevent early degenerative joint disease of the hip. Inclusion criteria were prospective or retrospective studies comparing skeletally mature asymptomatic patients with radiographic evidence of FAI treated with prophylactic hip arthroscopic surgery versus nonoperative management. As none of the references met the eligibility criteria, they conclude that current evidence does not support prophylactic surgery for asymptomatic FAI in the vast majority of cases. However, they also identified that limited evidence suggests that asymptomatic patients who have previously undergone total hip arthroplasty for FAI-induced osteoarthritis of the contralateral hip are at a significantly increased risk for early degenerative joint disease. Further research is needed through well-conducted clinical trials to better clarify surgical indications for prophylactic surgical intervention of patients with asymptomatic FAI.

de Sa et al. (2015) conducted a systematic review aimed to establish specific indications, outcomes, and complications of surgical management of adolescent FAI (patients aged 10-19 years of age). There were 6 eligible case series (4 with arthroscopic and 2 with open technique) and 2 conference abstracts examining 388 patients in total (435 hips), 81% of which were treated with hip arthroscopy. Overall, patients were followed up for a mean of 23.4 months postoperatively (range, 3 to 75 months). The main indication for surgery was a confirmed diagnosis of FAI with persistent pain and impaired function refractory to nonsurgical interventions (activity modification, intra-articular injections, etc.). The review concluded that both arthroscopic and open surgical dislocation approaches for the treatment of adolescent FAI appear to be safe and effective options for patients with persistent pain and limited function after an appropriate trial of nonoperative therapy.

Fukui et al. (2015) conducted a study of patients with dysplasia whose affected hip had a Wiberg center-edge angle of 20° to 25° and who underwent primary hip arthroscopy. One hundred two hips underwent hip arthroscopy with labral repair with correction of Femoroacetabular Impingement (FAI) and capsular closure. At a mean follow-up point of 40 months, the preoperative modified Harris Hip Score had improved from a mean of 63.5 points to a mean of 84.9 points. The mean score on the Western Ontario and McMaster Universities Arthritis Index improved from 25.3 to 9.7. The 12-Item Short Form Health Survey Physical Component Summary score also significantly improved (from 42.5 to 50.9), whereas the 12-Item Short Form Health Survey Mental Health Component Summary score showed an insignificant improvement (from 52.4 to 54.1). The authors concluded that this study showed that FAI and labral pathology can be successfully managed using hip arthroscopy, with capsular management, in patients with borderline dysplasia. Patients showed significant improvements in outcomes and high levels of satisfaction after hip arthroscopy.

Ayeni, et al. (2014) systematically reviewed the clinical literature to determine the identify outcomes addressing femoroacetabular impingement, especially those comparing labral debridement to labral repair. Six studies met the inclusion criteria. The authors concluded that the review demonstrates better reporting of clinical outcomes with labral repair compared to labral debridement in all studies. Five of six studies reported statistically significant improvements (of repair over debridement). However, given the lack of high quality evidence and associated limitations in study design, these results should be interpreted with caution. Definitive treatment recommendations require further investigation with well-conducted clinical trials.

Byrd and Jones (2011) found that most athletes treated with arthroscopic hip surgery were able to resume their activities. The authors reported on a case series of 200 patients identified who underwent arthroscopic management of femoroacetabular impingement, participated in athletic activities, and had achieved minimum 1-year follow up. The authors stated that there was 100% follow-up at an average of 19 months. A total of 116 athletes had achieved 2-year follow-up. The median preoperative score was 72 with a postoperative score of 96 and the median improvement was 20.5 points, which was statistically significant. The authors reported that 95% percent of professional athletes and 85% of intercollegiate athletes were able to return to their previous level of competition. There were 5 transient neurapraxias (all resolved) and 1 minor heterotopic ossification. One athlete (0.5%) underwent conversion to total hip

arthroplasty and 4 (2%) underwent repeat arthroscopy. For the group with minimum 2-year follow up, the median improvement was 21 points with a postoperative score of 96.

Clohisy et al. (2010) completed a systematic review of 2,834 studies of which 11 met the eligibility criteria and underwent comprehensive quality appraisal and review. Most studies were relatively small, single-surgeon cohorts. The review was completed to (1) determine the level of clinical evidence regarding FAI surgery; (2) determine whether impingement surgery relieves pain and improves hip function; (3) identify complications associated with these procedures; and (4) identify modifiable causes of failure. The current evidence regarding femoroacetabular impingement (FAI) surgery is primarily Level IV (case series) with no Level I (systematic review/randomized controlled trials) or II (prospective cohort) studies identified. All studies documented short decreased pain and improved function in the majority (65 to 96%) of patients with short term follow-up. Many of the studies also propose that certain factors are associated with a subjectively defined fair or poor functional score and/or surgical failure. These poor prognostic factors, although variably reported, include more advanced preoperative osteoarthritis (OA), advanced articular cartilage disease, older age, and more severe preoperative pain. These observations highlight the negative impact of secondary osteoarthritis on the long-term results of surgical intervention. Therefore, joint preservation impingement surgery should be undertaken with caution in the presence of secondary osteoarthritis. The authors concluded that the literature suggests hip impingement surgery is associated with early relief of pain and improved function; however, the impact on long-term clinical results and natural history has not been established. Future studies must focus on an improved set of end points to study this patient population more precisely. Refined, standardized, and validated methods of documenting disease classification, measuring clinical outcomes, and reporting perioperative complications are needed to facilitate more sophisticated clinical investigation. Most importantly, future clinical trials are needed to determine the relative efficacy of nonsurgical and surgical treatment. Predictors of treatment outcome and the efficacy of various surgical techniques need to be established in well-designed clinical trials.

Ng et al. (2010) conducted a systematic review of 23 reports (970 cases) to review the efficacy of surgical treatment for femoroacetabular impingement and which patients will have best outcomes. Multiple different outcome scores were used, including the Western Ontario and McMaster Osteoarthritic Index (WOMAC), the Harris hip score (HHS), the modified HHS (which includes only the pain and function portion of the original HHS), the visual analog scale (VAS), the SF-12 Health Survey (SF-12), the non-arthritic hip score (NAHS), and the Merle d'Aubigné hip score. The reported outcome scores improved after treatment for femoroacetabular impingement in all studies, and the effect size was significant for improvement in patient outcomes. Despite these improvements, up to 30% of patients will eventually require total hip arthroplasty (THA). Patients requiring revision to arthroplasty are those with Outerbridge grade III or IV cartilage damage seen intra-operatively or with preoperative radiographs showing greater than Tonnis grade I osteoarthritis. Mean improvement in pain ranged from 25.1% to 100%. Patients dissatisfied with the procedure or who had no improvement of their pain ranged from 0% to 31.2%. The authors concluded that surgical treatment for FAI reliably improves patient symptoms in the majority of patients without advanced osteoarthritis or chondral damage.

A systematic review by Bedi et al. (2008) reviewed 19 articles to determine the quality of the literature assessing outcomes after surgical treatment of labral tears and femoroacetabular impingement (FAI), patient satisfaction after open or arthroscopic intervention, and differences in outcome with open or arthroscopic approaches. The studies reviewed support that 65% to 85% of patients are satisfied with their outcome at a mean of 40 months after surgery. A common finding in all series, however, was an increased incidence of failure among patients with substantial pre-existing osteoarthritis. Arthroscopic treatment of labral tears is also effective, with 67% to 100% of patients being satisfied with their outcomes. The authors concluded that the quality of literature reporting outcomes of surgical intervention for labral tears and FAI is limited. Although open surgical dislocation with osteoplasty is the historical gold standard, the scientific data does not show that open techniques have outcomes superior to arthroscopic techniques.
A prospective study by Philippon et al. (2009) reported 2 year outcomes of 112 patients who underwent arthroscopic surgery of the hip for femoroacetabular impingement. Mean age was 40.6 yrs. At arthroscopy, 23 patients underwent osteoplasty only for cam impingement, 3 underwent rim trimming only for pincer impingement, and 86 underwent both procedures for mixed-type impingement. Mean follow-up was 2.3 years. Mean modified Harris hip score (HHS) improved from 58 to 84 (mean difference = 24 and the median patient satisfaction was 9 (1 to 10). Continuous passive motion (CPM) was used at night although compliance with this was not recorded. Ten patients underwent total hip replacement at a mean of 16 months (8 to 26) after arthroscopy. Of the remaining 102 patients, 12 were lost to follow-up and two-year outcomes were thus obtained for 90 patients. Eight patients did not show any improvement in their modified HHS, with a mean pre-operative score of 66 and a mean post-operative score of 50. The authors concluded that hip arthroscopy for femoroacetabular impingement, accompanied by suitable rehabilitation, gives good short-term outcomes and high patient satisfaction; however, it is unclear how this procedure will affect the long-term outcome of the hip joint.

Byrd and Jones (2009) reported on arthroscopic management of cam-type impingement in a prospective study of 200 patients. The average increase in Harris hip score was 20 points; 0.5% converted to THA with a 1.5% complication

rate. The short-term outcomes of arthroscopic treatment of cam-type femoroacetabular impingement are comparable to published reports for open methods with the advantage of a less invasive approach. The authors recognized that the surgery can result in successful outcomes, the hip joint can never be truly restored to a disease-free state, and emphasis on injury prevention is essential. A bimodal age distribution with the older cohort reflected the early onset of adult osteoarthritis. The authors indicated that with better recognition of impingement and offending activities, substantial strides could be made in non-operative management.

Horisberger (2010) prospectively followed a cohort of 105 hips (88 patients; 60 males, 28 females) who underwent surgery for symptomatic cam or mixed femoroacetabular impingement. At a minimum follow-up of 1.3 years (average, 2.3 years; range, 1.3-4.1 years), all clinical outcome measures improved. Nine patients (8.6%) underwent THA during follow-up. The outcome measures after arthroscopic therapy for femoroacetabular impingement seem comparable to those reported after open procedures.

Steppacher et al. (2015) surveyed 72 out of 75 original patients with FAI at a minimum of 10 years after having surgical hip dislocation, osteoplasty, and labral reattachment to measure improved hip pain and function, determined the 10-year survival rate and calculated factors predicting failure. Results showed that 80% of patients with FAI treated with this type of surgical intervention had not progressed to total hip arthroscopy, developed worsening osteoarthritis, or had a Merle d'Aubigné-Postel (MAP) score of less than 15 (out of a possible score of 18) which would represent a fair or poor outcome. (The MAP questionnaire is used to assess a patient's health-related quality of life post-operatively.)

Hartmann (2009) retrospectively evaluated 33 patients 15 months after an arthroscopically assisted mini-open anterior approach to compare it with the results after surgical dislocation for FAI. The mean Harris hip score (HHS) improved from 64 points preoperatively to 85 points at the time of follow-up ($P < 0.001$). Mean patient satisfaction on the visual analog scale (VAS) was 7 points (range: 2-10 points). In two of the patients observed, a transient femoral nerve palsy (completely resolved at follow-up) was observed and 15 patients reported numbness in the area of the lateral cutaneous femoral nerve. The author concluded that treatment of anterior femoroacetabular impingement through an arthroscopically assisted mini-open anterior approach can reduce pain and improve function in a short-term observation period.

Peters et al. (2009) conducted a retrospective review of 94 patients (96 hips) to evaluate the change in clinical pain and function after open treatment as well as determine whether failure of treatment and progression of osteoarthritis was associated with Outerbridge Grade IV hyaline cartilage injury. Mean follow-up was 26 months (range, 18-96 months). Harris hip scores (HHS) were used to measure outcomes. The average hip score improved from 67 to 91 at final follow-up. Six patients (6.25%) were considered clinical failures and converted to arthroplasty due to worsening of the HHS. At last follow-up, the Tonnis grade worsened in 25 of 96 hips; however 23 of these 25 hips (92%) continued to function well with an improved HHS. In the 71 hips without radiographic progression, 24 had Outerbridge Grade IV lesions, 7 had Grade III, and 40 had Grade 0 to II. There was a lower incidence of Outerbridge Grade IV lesions in the hips without radiographic progression of osteoarthritis (24 of 71 hips, 35%) than those with progression (17 of 25 hips, 70%). The authors concluded that open treatment for femoroacetabular impingement in hips without substantial acetabular hyaline cartilage damage reduced pain and improved function with a low complication rate.

A retrospective study by Beaule et al. (2007) evaluated the quality of life after osteochondroplasty of the femoral head-neck junction for the treatment of femoroacetabular impingement. Thirty-seven hips in 34 patients with persistent hip pain and a mean age of 40.5 years underwent surgical dislocation of the hip and osteochondroplasty of the femoral head-neck junction for the treatment of camtype femoroacetabular impingement. The mean score on the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) increased postoperatively, the mean University of California at Los Angeles (UCLA) activity score increased, the mean Short Form-12 (SF-12) physical component score increased, and the mean SF-12 mental component score increased. None of the hips underwent additional reconstructive surgery and 6 of the 34 patients were dissatisfied with the outcome. Ten patients required a reoperation that was directly related to the surgical dislocation approach (e.g., screw removal or a reoperation because of failed trochanteric fixation). The authors concluded that treatment of cam-type femoroacetabular impingement with osteochondroplasty of the femoral head-neck junction is safe and effective and can provide a significant improvement in the overall quality of life of most patients.

Laude et al. (2009) retrospectively reviewed 97 patients (100 hips) who underwent osteochondroplasty of the femoral head-neck for FAI using a mini-open anterior Hueter approach with arthroscopic assistance. The labrum was refixed in 40 hips, partially excised in 39 cases, completely excised in 14 cases, and left intact in 7. Six patients were lost to follow-up, leaving 91 (94 hips) with a minimum follow-up of 28.6 months (mean, 58.3 months; range, 28.6-104.4 months). One hip developed a femoral neck fracture and 11 hips developed osteoarthritis and required a total hip arthroplasty. The technique for FAI treatment allowed direct visualization of the anterior femoral head-neck junction while avoiding surgical dislocation, had a low complication rate, and improved functional scores.

An uncontrolled study by Larson and Giveans (2008) on 96 patients (100 hips), was conducted to evaluate the early outcomes of arthroscopic management of femoroacetabular impingement (FAI). There were 54 male and 42 female patients with a mean age was 34.7 years. The surgical procedures performed were 26 (26%) proximal femoral osteoplasties, 21 (21%) acetabular rim trimmings, and 53 (53%) combination osteoplasties and trimmings. Patients also underwent labral debridement and repair or refixation as needed. At a mean of 10 months follow-up compared with baseline, mean pain score decreased from 6.7 to 1.9, mean Harris Hip score increased from 61 to 83, and mean SF-12 quality-of-life score increased from 60 to 78. All of these improvements were statistically significant ($P<0.001$). A total of 3 (3%) patients underwent total hip arthroplasty due to insufficient relief from arthroscopic surgery. The authors concluded that arthroscopic management of patients with FAI results in significant improvement in outcomes measures, with good to excellent results being observed in 75% of hips at a minimum 1-year follow-up; however, alteration in the natural progression to osteoarthritis and sustained pain relief as a result of arthroscopic management of FAI remain to be seen. This study is further limited by intervening variables in that some patients labral debridement and repair or refixation.

Matsuda et al. (2011) conducted a literature review to analyze the current approaches to the surgical management of symptomatic femoroacetabular impingement (FAI). Eighteen peer-reviewed treatment outcome studies met the inclusion criteria with minimum 1-year follow-up of the surgical treatment of skeletal pathoanatomy and associated chondrolabral pathology in skeletally mature patients with FAI. There were 6 open surgical dislocation, 4 mini-open, and 8 arthroscopic studies. The authors found that open dislocation, mini-open, and arthroscopic methods for treating symptomatic FAI are effective in improving pain and function in short-term to midterm studies and are relatively safe procedures. The historical gold standard of open dislocation surgery had a comparatively high major complication rate primarily because of trochanteric osteotomy-related issues. The mini-open method showed comparable efficacy but a significant incidence of iatrogenic injury to the lateral femoral cutaneous nerve in some studies. The arthroscopic method had surgical outcomes equal to or better than the other methods with a lower rate of major complications when performed by experienced surgeons.

The 2016 Warwick Agreement on femoroacetabular impingement (FAI) syndrome was convened to build an international, multidisciplinary consensus statement on the diagnosis and management of patients with FAI syndrome. "FAI syndrome can be treated by conservative care, rehabilitation or surgery. Conservative care may involve education, watchful waiting, lifestyle and activity modification. Physiotherapy-led rehabilitation aims to improve hip stability, neuromuscular control, strength, range of motion and movement patterns. Surgery, either open or arthroscopic, aims to improve the hip morphology and repair damaged tissue. Physiotherapy-led rehabilitation aims to improve hip stability, neuromuscular control, strength, range of motion and movement patterns. Surgery, either open or arthroscopic, aims to improve the hip morphology and repair damaged tissue. The good management of the variety of patients with FAI syndrome requires the availability of all of these approaches." Level of agreement: mean score 9.5 (95% CI 9.0 to 10). (Griffin et al. 2016)

The National Institute for Health and Care Excellence (NICE) 2011 guidance documents state that the current evidence on the safety and efficacy for arthroscopic and open femoroacetabular surgery for hip impingement syndrome is adequate in terms of symptom relief in the short and medium term. (NICE, 2011)

U.S. FOOD AND DRUG ADMINISTRATION (FDA)

Although arthroscopic hip surgery for FAI is a procedure that is not subject to FDA regulation, devices and instruments used during the surgery require FDA approval. A search of the FDA 510(k) database revealed over 500 arthroscopies approved for marketing (product code HRX); however, the available studies did not provide sufficient information to determine which 510(k) approvals correspond to the instruments used.

Additional information is available at: http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/_pmn.cfm. (Accessed September 14, 2018)

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The foregoing Oxford policy has been adapted from an existing UnitedHealthcare national policy that was researched, developed and approved by UnitedHealthcare Medical Technology Assessment Committee. [*2018T0530L*]

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POLICY HISTORY/REVISION INFORMATION

Date	Action/Description

01/01/2019	• Reorganized policy template:
	  ○ Simplified and relocated *Instructions for Use*
	  ○ Removed *Benefit Considerations* section
	• Updated coverage rationale:
	  ○ Modified language to clarify surgical treatment for femoroacetabular impingement (FAI) syndrome is *proven and* medically necessary when the [listed] criteria are met
	  ○ Replaced criterion requiring:
	  ▪ "Moderate-to-severe persistent hip or groin pain that limits activity and is worsened by *flexion activities (e.g.,* squatting or prolonged sitting)" with "moderate-to-severe *symptoms typical of FAI* (persistent hip or groin pain that limits activity and is worsened by *bending of the joint such as* squatting or prolonged sitting)"
	  ▪ "*Radiographic* confirmation of FAI" with "*imaging studies (X-rays, MRI or CT scans)* confirming FAI"
	• Added *Definitions* section; relocated definitions previously outlined in the *Coverage Rationale* section
	• Updated supporting information to reflect the most current description of services, clinical evidence, and references
	• Archived previous policy version SURGERY 074.12 T2

INSTRUCTIONS FOR USE

This Clinical Policy provides assistance in interpreting UnitedHealthcare Oxford standard benefit plans. When deciding coverage, the member specific benefit plan document must be referenced as the terms of the member specific benefit plan may differ from the standard plan. In the event of a conflict, the member specific benefit plan document governs. Before using this policy, please check the member specific benefit plan document and any applicable federal or state mandates. UnitedHealthcare Oxford reserves the right to modify its Policies as necessary. This Clinical Policy is provided for informational purposes. It does not constitute medical advice.

The term Oxford includes Oxford Health Plans, LLC and all of its subsidiaries as appropriate for these policies. Unless otherwise stated, Oxford policies do not apply to Medicare Advantage members.

UnitedHealthcare may also use tools developed by third parties, such as the MCG™ Care Guidelines, to assist us in administering health benefits. UnitedHealthcare Oxford Clinical Policies are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.