

Patients undergoing hip arthroscopy with active workers' compensation claims do not demonstrate inferior outcomes at mid-term

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Itay Perets^{1,2}, Dan Prat³, Mary R. Close¹, Edwin O Chaharbakhshi¹, Stephanie M Rabe¹, Muriel R Battaglia¹ and Benjamin G Domb^{1,4}

Abstract

Introduction: Workers' compensation (WC) claims have been associated with poor short-term outcomes after hip arthroscopy. We aim to report mid-term outcomes and return to work (RTW) among patients with WC claims.

Methods: Data were prospectively collected and retrospectively reviewed for patients undergoing hip arthroscopy between September 2008 and July 2011. Inclusion criteria were an active WC claim at time of surgery with preoperatively-documented patient-reported outcomes (PROs). Exclusion criteria were a previous hip condition and preoperative Tönnis grade > 1. Patient-reported WC cases were pair-matched to non-WC cases based on body mass index (BMI) \pm 5, age \pm 5 years, gender, preoperative LCEA, labral treatment, and capsular treatment.

Results: 52 patients had minimum 5-year outcomes. Mean age was 40.6 (\pm 10.6) years and a mean BMI of 27.5 (\pm 5.3). 9 (16.7%) hips underwent secondary arthroscopies. 5 hips (9.3%) were converted to THA. There were 5 (9.3%) reports of numbness, all of which resolved spontaneously. Work status details were available for 49 patients and 47 patients (95.9%) returned to work. 42 WC hips were matched to 42 control hips. At \geq 5-year follow-up, patient-reported outcomes, visual analogue scale (VAS) and satisfaction were not different between the groups. All magnitudes in improvement were significantly higher in the WC group ($p = < 0.001$) except for VAS. No significant differences were found in rates of secondary arthroscopies, conversions to THA, or complications between the groups.

Conclusions: WC patients have equal favourable mid-term outcomes as non-WC patients after hip arthroscopy for the treatment of femoroacetabular impingement and labral pathology.

Keywords

Clinical outcomes, hip arthroscopy, mid-term, workers compensation claim

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Introduction

Inferior outcomes associated with workers' compensation (WC) claims and pending litigation have been demonstrated in several orthopaedic surgical treatments. Among these, a negative effect for WC was found in total knee arthroplasty,¹ rotator cuff repair,² anterior shoulder stabilisation,³ anterior cruciate ligament reconstruction,⁴ and in cervical discectomy and fusion.⁵ In a meta-analysis of any surgical intervention, 95% of 129 studies reviewed demonstrated a relationship between active WC status and inferior outcomes.⁶ The authors concluded that WC

patients are 3 times more likely to have unsatisfactory outcomes compared with non-WC patients. Authors of another meta-analysis of 20 prospective studies evaluating

¹American Hip Institute, Westmont, Illinois, USA

²Hadassah Hebrew University Hospital, Jerusalem, Israel

³Chaim Sheba Medical Center at Tel Hashomer, Tel Aviv, Israel

⁴Hinsdale Orthopaedics, Westmont, Illinois, USA

Corresponding author:

Benjamin G Domb, American Hip Institute, 1010 Executive Court Suite, 250 Westmont, IL 60559, USA.

Email: DrDomb@americanhipinstitute.org

WC status and orthopaedic surgery outcomes found a 2-fold greater risk of a negative outcomes in WC patients.⁷

Hip arthroscopy is an established procedure for the treatment of pathologic conditions in and around the hip joint; despite this, patient selection is an essential factor in the predictability of outcomes.^{8,9} Recent advancements throughout the literature have addressed WC patients with hip pain requiring surgical intervention; however, the evidence lacks data supporting mid-term outcomes in WC patients requiring hip arthroscopy.¹⁰⁻¹² Additional research may yield information to help improve outcomes, facilitate appropriate expectations, increase productivity and lessen economic burden.

We aim to report mid-term outcomes and return to work (RTW) among patients with WC claims.

Patients and methods

Patient selection

Between September 2008 and July 2011, data were prospectively collected on all patients who underwent hip arthroscopy. The inclusion criteria for this study included arthroscopic hip surgeries, active WC claim at time of surgery, eligibility for 5-year follow-up, and preoperatively-documented patient-reported outcomes (PROs), including modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), Hip Outcome Score – Sports Specific Subscale (HOS-SSS), and visual analogue scale (VAS). The exclusion criteria were prior surgery on the affected hip, preoperative Tönnis grade >1, dysplasia (lateral centre-edge angle [LCEA] <18°), and prior hip conditions including hip fractures, slipped-capital femoral epiphysis, Legg-Calvé-Perthes disease, and avascular necrosis. All patients participated in the American Hip Institute Hip Preservation Registry. While the present study represents a unique analysis, data on some patients in this study may have been reported in other studies. All data collection received Institutional Review Board approval.

Preoperative radiographic measurements

All patients had preoperative anteroposterior (AP) pelvis upright and supine, false profile, and Dunn view radiographs. All measurements were made by an orthopaedic surgeon using the GE Healthcare Picture Archiving and Communication System (GE-PACS; Fairfield, CT). The LCEA was measured as described by Wiberg using the supine AP radiograph and Tönnis was determined using all radiographic views.

Surgical indications for hip arthroscopy

All patients had FAI and labral tears which were based on patient history, physical examination and imaging findings.

All patients had failed to improve with ≥ 3 months of conservative treatment (rest, nonsteroidal anti-inflammatory drugs (NSAIDs), intraarticular injections, and physical therapy). Surgeries were performed at the same institution by the senior author (BGD).

Patient-reported outcomes tools

The PROs collected for this study include the mHHS, NAHS, HOS-SSS, and the International Hip Outcome Tool-12 (iHOT-12) which are scored from 0 to 100, with 100 representing the worst function. Pain was estimated using VAS on a scale from 0 to 10, with 10 representing the worst pain. Patient satisfaction after surgery was collected at follow-up on a scale from 0 to 10, with 10 being the highest satisfaction. All outcomes were documented and calculated using an encrypted electronic questionnaire and database.

The mHHS, NAHS, HOS-SSS, and VAS were documented preoperatively. These measurements, iHOT-12 and satisfaction, were collected postoperatively at 3 months and annually thereafter. Follow-up questionnaires were completed in clinic, through our online portal, or over the phone. Complications from surgery, second-look arthroscopy, and/or conversion to THA were documented at all time points.

Matching criteria

A matched-pair analysis was conducted to examine how WC outcomes compared to a control group of non-WC patients. Pair-matching was performed based on body mass index (BMI) ± 5 , age ± 5 years, gender, preoperative LCEA group, labral treatment, and capsular treatment. LCEA groups were borderline dysplastic (18–25°), normal (26–39°), and over-covered (>39°).

Return to work

A retrospective chart review was conducted to collect preoperative and latest work statuses for all surgeries. Patients were delegated to 1 of 3 groups: RTW, RTW with restrictions, and unable to RTW. The reason for not returning to full work, whether related to the surgical hip or an additional issue, was documented for each patient. The time between surgery and returning to work was collected as well. All determinations were made based on the work status reports submitted by the senior surgeon (BGD).

Statistics

Continuous data were tested for normalcy using the Shapiro-Wilk test before data sets were compared. Normally distributed data were compared using the

Table 1. Demographics for workers' compensation patients undergoing arthroscopic hip surgery.

	<i>n</i>
Cases eligible	64
Cases w/ 5 yr	54
Patients	52
Gender	
Male	39
Female	15
Age (years)	40.6 ± 10.6
BMI	27.5 ± 5.3

F/U, follow-up; BMI, body mass index.

paired 2-tailed t-test and non-normally distributed data were compared using the Wilcoxon Signed-Rank test for paired samples. Categorical data were compared using the chi-square test or Fisher's exact test, depending on the distribution sizes of the groups. All analyses were performed using Microsoft Excel (Microsoft Corporation; Redmond, WA).

Results

Demographics

Of the 64 cases that were eligible for inclusion, 54 (84.4%) hips in 52 patients had minimum 5-year outcomes and were included in this study. The WC group's demographics are detailed in Table 1. This group comprised of 39 males and 15 females and had a mean age of 40.6 (±10.6) years old and a mean BMI of 27.5 (±5.3). 9 (16.7%) hips underwent secondary arthroscopies at a mean time of 24.6 (±15.0) months after surgery. 5 hips (9.3%) converted to THA at a mean time of 22.7 (±20.7) months after surgery. There were 5 (9.3%) reports of numbness, all of which resolved on their own. No other complications were reported.

Radiographic findings

Prior to surgery, 37 hips were Tönnis 0 and 14 were Tönnis 1. The mean LCEA was 31.1° (±6.0°), with 12 (22.2%) hips considered borderline dysplastic, 39 (72.2%) hips considered normal, and 3 (5.6%) hips considered over-covered.

Return to work

The breakdown of how many patients returned to work is detailed in Figure 1. Work status details were available for 49 patients (91%), 36 of which had pre-op work status information in addition to their latest work status. Before surgery, 20 patients (56%) were unable to work and 16 (44%) worked with restrictions. After surgery, at mean

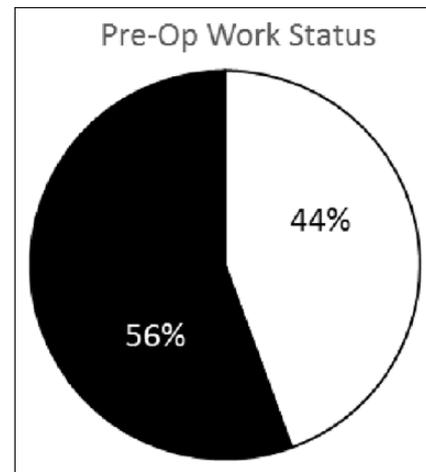


Figure 1a. Work statuses as detailed on work status reports prior to surgical intervention. Thirty-six patients had this information available upon retrospective review are included in this analysis designated as unable to RTW.

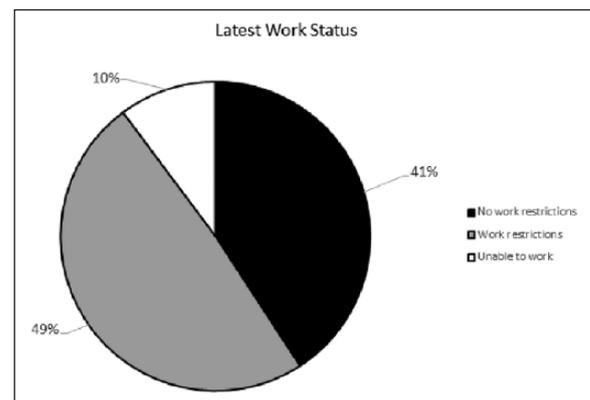


Figure 1b. Work statuses as detailed on latest work status reports after surgical intervention. Forty-nine patients had this information available upon retrospective review are included in this analysis. All five patients (10%) that were ultimately unable to work had additional injuries to body parts other than the hip; three of these five patients were initially able to RTW before being.

time of 6.3 months, 47 patients (95.9%) returned to work. The 2 patients who never returned to work were employed in heavy physical occupations: 1 patient care technician and 1 mechanic. Of those that returned to work, 3 patients (6.1%) changed their status at their latest work status report and were unable to RTW. These individuals were involved in medium to heavy physical occupations: 1 police officer, 1 construction worker, and 1 barista.

A total of 5 patients (10.2%) were unable to RTW at latest work status report, all of whom had additional injuries beyond the hip. These patients were employed in medium ($n = 1$) and heavy ($n = 4$) physical occupations. Of those who returned to work, 24 patients (54.4%) did so with restrictions. 2 of these patients were employed in

Table 2. Future surgeries and postoperative complications for Workers' Compensation (WC) and control groups.

	WC	Control	<i>p</i> value
Hips matched	42	42	
Second Arthroscopy	7 (16.7%)	4 (9.5%)	0.516
Time to arthroscopy	24.4 ± 16.9	31.3 ± 20.3	0.786
Conversion to THA	4 (9.5%)	9 (21.4%)	0.227
Time to THA	25.2 ± 23.0	42.5 ± 19.2	0.68
Complications	4 (9.5%)	4 (9.5%)	>0.999

THA, total hip arthroplasty.

p < 0.05 was considered statistically significant.

light physical occupations: 1 school counselor and 1 attorney. The rest worked in medium to heavy physical occupations: movers, construction workers, truck drivers, maintenance workers, and medical professionals. The number of patients who had returned to work with restrictions, the number without restrictions, and the number unable to work at all were significantly different pre- to postoperatively (*p* < 0.0001).

Outcomes at latest follow-up

All PROs and VAS improved significantly from preoperative to ≥5-year follow-up (*p* < 0.001). mHHS improved from 46.9 to 78.5 (*p* < 0.001), NAHS improved from 40.6 to 77.0 (*p* < 0.001), HOS-SSS improved from 18.7 to 63.5 (*p* < 0.001), and VAS improved from 6.7 to 3.0 (*p* < 0.001). iHOT-12 was 64.6 and satisfaction was 7.8 at latest follow-up.

42 WC cases in 40 patients were successfully matched per the matching criteria to 42 cases in 42 patients who did not have WC claims. Preoperative mean PROs and VAS were significantly lower for the WC group than the control group: mHHS (WC = 46.1, Control = 67.7; *p* = < 0.001), NAHS (WC = 39.0, Control = 65.0; *p* = < 0.001), HOS-SSS (WC = 18.1, Control = 51.2; *p* = < 0.001), and VAS (WC = 6.8, Control = 5.2; *p* = < 0.001). At ≥ 5-year follow-up, PROs and VAS were not significantly different between the groups. In addition, patient satisfaction, 7.7 for WC and 7.6 for control, was not significantly different at ≥5-year follow-up. All magnitudes in improvement were significantly different (*p* = < 0.001) between these groups except for VAS (*p* = 0.206). These outcomes findings are detailed in Figure 2.

Table 2 details the comparisons of secondary arthroscopies, conversions to THA, and complications between WC and control groups. There were no significant differences found in these comparisons. The WC group had 4 accounts of numbness and the control group had 3 accounts of numbness as well as 1 infection. All numbness was resolved over time and the infection was resolved using topical medication.

Discussion

54 hips had minimum 5-year follow-up and were included in this study. All PROs and VAS improved significantly from preoperative to ≥5-year follow-up. 9 hips (16.7%) underwent secondary arthroscopies and 5 hips (9.3%) converted to THA. Work status details were available for 49 patients, of which 47 patients (95.9%) returned to work. 42 WC hips were matched to 42 control hips. Preoperative mean PROs and VAS were significantly lower for the WC group than the control group. At ≥5-year follow-up, PROs, VAS and satisfaction were not significantly different between the groups. All magnitudes in improvement were significantly higher in the WC group compare to the control group except for VAS. There were no significant differences in rates of secondary arthroscopies, conversions to THA, or complications between WC and control groups.

Contrarily, a previous analysis of the 2-year results of patients who underwent hip arthroscopy for labral tears, comparing WC patients to non-WC, demonstrated that WC patients experience improved PRO scores after intervention; however, the WC group maintained significantly lower scores at 2 years in comparison to the non-WC group.¹⁰ Another recent retrospective study compared 3 groups of patients undergoing hip arthroscopy with a minimum of 1-year follow-up; group 1 included work-related injuries with active claims (AC), group 2 included sports injuries with no ACs, and group 3 included non-sports-related injuries without pending ACs.¹² In spite of our findings, baseline score for all groups did not significantly differ. Nevertheless, as in other short-term studies, WC patients had the lowest final evaluation scores, while the sports group had the highest.

The normalisation in PRO scores in the WC group between 2–5 years of follow-up, in comparison to the results of the 2-year follow-up study by Stake et al.,¹⁰ raises questions about the natural history of WC claims. It remains unclear what occurs after 2 years of follow-up that affects PRO results, and whether the duration of open WC claims or legal representation impact results. A recent review of the evidence found a strong association between legal representation and poorer physical function in WC patients. Additionally, moderate evidence has demonstrated an association between representation and poorer psychological function and that time of claim closure at 2 years was associated with a higher report of recovery.^{13,14} Several studies have also demonstrated the close effect of legal representation on outcomes following “whiplash,” injuries. Changes in legislation designed to reduce compensation and encourage early treatment following whiplash injury resulted in improvement in disability, pain, and recovery.¹⁵

There are several publications reviewing WC claim duration for musculoskeletal injuries. 1 study by Busse

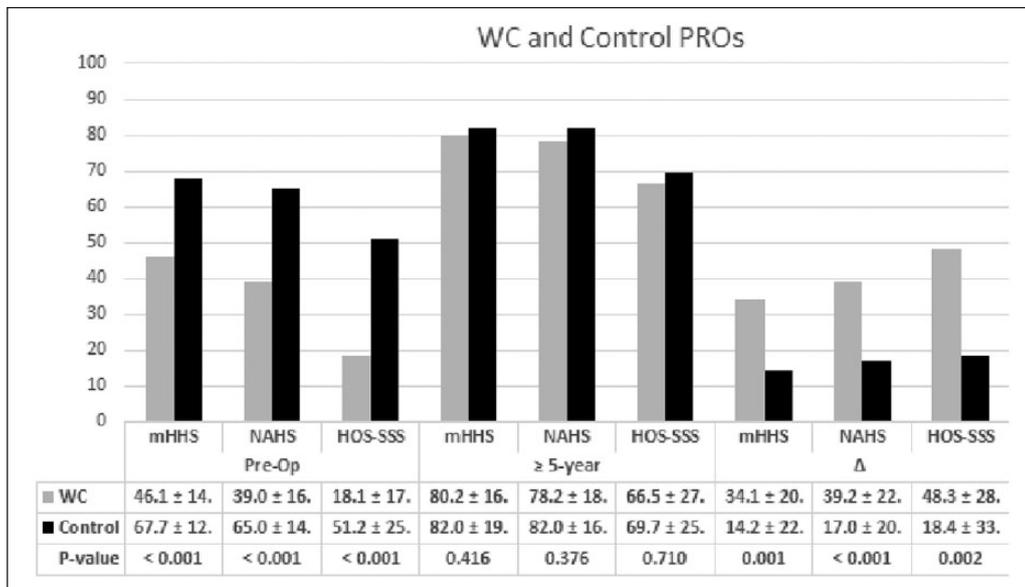


Figure 2a. Preoperative, = 5-year, and Δ patient reported outcomes (PROs) for WC (blue) and control (red) patients 1:1 pair matched *p*-values <0.05 were considered statistically significant. mHHS, modified Harris Hip Score; NAHS, Non-Arthritic Hip Score; HOS-SSS, Hip Outcome Score – Sports Specific Subscale; iHOT, international Hip Outcome Tool.

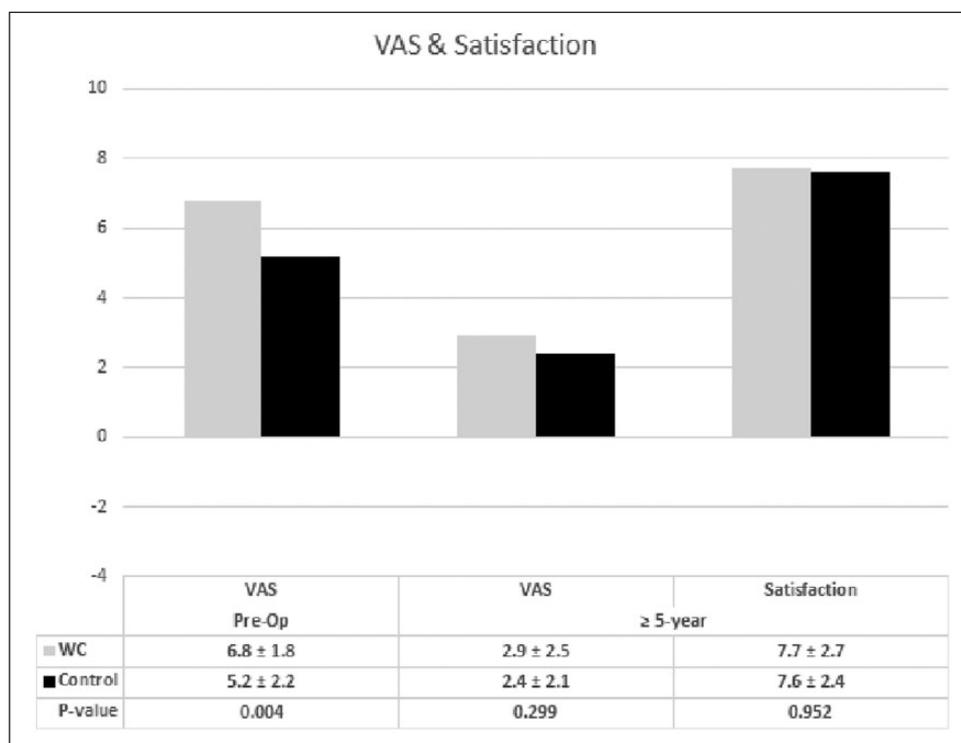


Figure 2b. Preoperative and = 5-year visual along scale (VAS) for pain and satisfaction for workers’ compensation cases. *p*-values <0.05 were considered statistically significant.

et al.¹⁶ found that most claims had resolved by 90 days. In a Kaplan-Meier curve of time to claim closure, 67% had resolved their claim by 90 days, 84% by 180 days, 91% by 1 year, and 93.5% claims were closed prior to 2 years. In a

study of patients receiving WC after arthroscopic partial meniscectomy, the mean duration of symptoms between the time of the injury and the date of surgery was 4.5 months (with a range of 1–19 months), and the time of

claim closure after surgery averaged at 18.2 weeks (4.2 months) with a median of 15 weeks (3.45 months).¹⁷ In our study, the average time to surgery after the injury was 548 days (1.5 years), which is longer than in the aforementioned studies. This may be a result of the often delayed diagnosis of labral pathology. With surgery occurring, on average, at 548 days post injury in our cohort, a time period of 2 years is a close estimation of the duration of WC claims. Given the previous literature regarding open claims and poorer patient outcomes, this may further provide insight as to the normalisation of PRO at 5-year follow-up, when most WC claims are settled.

In a WC study, 15 of 26 patients (58%) had returned to work at latest follow-up.¹¹ Of these, 11 returned to full duty and 4 returned to modified duty. 5 of 26 patients (19%) remained on total disability, and 1 was out of work at their most recent follow-up. In a recent study by Lee et al.,¹⁸ 20 of 29 (69%) of WC patients were able to RTW without restrictions. Factors associated with failure to RTW without restrictions include prolonging the time between injury and surgical treatment, concomitant orthopaedic injuries, and a higher BMI. In comparison to these findings, our study demonstrates a higher RTW rate (95.9%, 47 of 49 patients), at a mean time of 6.3 months, which is comparable to other studies. At the latest work status report, 3 patients (6.1%) in our study changed their status and were unable to RTW. In total, 89.8% of patients returned to work, of which 45.6% returned to work without restrictions and 54.4% returned to work with restrictions. In comparison, the rate of RTW after hip arthroscopy in a cohort of non-WC patients in a study by Philippon et al.¹⁹ was reported at 100%.

There are several strengths to our study. This is a pair-matched study controlling for age, BMI, gender, preoperative LCEA, labral treatment, and capsular treatment. In addition, our minimum 5-year outcome scores were comprised using a variety of validated outcome tools.

In contrary, our study also has its limitations. This is a small sample size population, with a total of 42 matched control hips. In addition, minimum 5-year radiographic and physical examination findings for most patients were unavailable for use in this study.

In conclusion, WC patients have equal favourable mid-term outcomes as non-WC patients after hip arthroscopy for the treatment of FAI and labral pathology.

Declaration of conflicting interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr. Domb is a board member for American Orthopedic Foundation, American Hip Foundation, AANA Learning Center Committee, Hinsdale Hospital Foundation, and Arthroscopy Journal; Consulting Fees from Adventist Hinsdale Hospital, Amplitude, Arthrex, MAKO, Medacta, Pacira Pharmaceuticals,

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