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Quality of life impairments after hip arthroscopy in people with hip chondropathy

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ABSTRACT

Many young individuals undergoing hip arthroscopic surgery have hip chondropathy. The impact of mild or more severe hip chondropathy 1–2 years following arthroscopy is poorly understood. The purpose of this study was to (i) compare health-related quality of life (HRQoL), anxiety and depression scores between people who underwent arthroscopic treatment for hip chondropathy 1–2 years previously and pain-free controls; (ii) compare HRQoL, hip-related quality of life (QoL) and anxiety/depression scores in people with mild versus severe hip chondropathy and (iii) compare hip-related QoL items between chondropathy groups. The Hip disability and Osteoarthritis Outcome Score (HOOS), International Hip Outcome Tool (iHOT-33), EuroQol-5D and Hospital Anxiety and Depression Scale (HADS) were compared between 71 individuals aged 18–60 years following arthroscopic treatment for hip chondroplasty (12–24 months previously) and 46 healthy controls. Comparisons were also performed between people with mild (Outerbridge grade 1–2) and severe (Outerbridge grade 3–4) hip chondropathy. Participants following arthroscopic treatment for hip chondroplasty reported worse HRQoL, hip-related QoL and anxiety, compared with pain-free controls (all $P < 0.05$), but no difference in self-care ($P = 0.20$). There were differences between mild and severe chondropathy groups for pain during sport/recreation [median (IQR) 20 (5–80) versus 60 (25–90) $P = 0.01$), pain after activity (40 (20–75) versus 75 (50–90) $P = 0.01$), difficulty maintaining fitness (30 (10–70) versus 75 (35–85) $P = 0.02$) and reduced hip confidence. Hip chondropathy was associated with significant QoL impairment, with severe chondropathy associated with the greatest impairment. The identification of specific areas of QoL impairment provides avenues to target rehabilitation and support.

INTRODUCTION

Osteoarthritis (OA) frequently affects the hip joint and is a major global public health problem with substantial psychological, physical, societal and economic impacts [1]. Approximately 12% of adults in the United Kingdom [2] and 9% of adults aged 45 years and over in the United States have symptomatic hip OA [3]. While increasing age is an established risk factor for OA [4], approximately one in three Australians with OA of the hip are under 55 years of age [5]. Young and middle aged adults may be living with hip pain related to intra-articular pathology for some years before being diagnosed with hip OA. Hip arthroscopy is commonly performed to diagnose and treat severe and restrictive hip pain, and rates of surgery are rapidly rising. Notably in the United States, arthroscopy rates increased by 365% over 5 years (2004–2009), with the majority of surgeries performed in young adults aged 20–39 years [6]. The impact of this dramatic rise is compounded by the high proportion of hip arthroscopy patients (37%) who will undergo a total hip arthroplasty within 10 years following surgery [7]. A common pathology identified

during arthroscopy for persistent hip pain is hip chondropathy (structural changes in hip articular cartilage). Our earlier work reported a high prevalence of hip chondropathy in young adults and more hip-related quality of life (QoL) impairment after hip arthroscopy in individuals with more severe chondropathy compared to individuals with milder chondropathy [7] However, the factors relating to this observed difference in hip-related QoL are poorly understood.

It is possible that the chondropathy seen at arthroscopy represents the earlier stages of hip OA. The goals and life priorities of young and middle-aged adults with early signs of OA may not be comparable to those of an older OA population, due to differing responsibilities such as work requirements, parental roles and sports participation [1] Younger OA populations report more frustration and distress in managing their OA, in contrast to older populations who are more likely to accept the condition as a normal part of aging [8]. It is not known whether general health outcomes or psychological health [e.g. health-related QoL (HRQoL), anxiety or depression] differ between mild and severe chondropathy groups, and how these compare to pain-free age- and gender-matched individuals. Furthermore, assessment of specific hip-related QoL impairments, or the influence of hip-related factors on an individual's perceived well-being and life satisfaction, will improve our understanding of the personal impact of hip chondropathy and early OA and could assist in designing targeted rehabilitation programs. This study aimed to: (i) compare hip-related QoL, HRQoL, anxiety and depression between people after arthroscopic treatment for hip chondropathy and an age-, gender- and physical activity-matched pain-free control group; (ii) explore differences in HRQoL, anxiety and depression scores between people with mild and severe chondropathy; and (iii) compare specific hip-related QoL items between chondropathy groups to explain previously identified differences in overall hip-related QoL scores.

MATERIALS AND METHODS

Ethics approval for this community-based study was provided by The University of Melbourne Human Research Ethics Committee (HREC number 1033063) and The University of Queensland Medical Research Ethics Committee (MREC number 2012000708).

Participants

Seventy-two patients who underwent arthroscopic surgery for intra-articular hip pathology in the previous 12–24 months were identified from the records of a high volume, fellowship-trained hip arthroscopist in Hobart and Melbourne, Australia and invited to participate in the study. Details of the cohort including recruitment and eligibility criteria have been published [7], and the recruitment process is summarized in Fig. 1. Briefly, consecutive patients from a single surgeon who underwent hip arthroscopy for painful intra-articular hip pathology were invited to participate. Eligible participants were: (i) aged 18–60 years; and (ii) diagnosed with hip chondropathy ($\geq$ grade 1 on the Outerbridge classification system) [9] during hip arthroscopy 12–24 months previously. Patients were excluded if they: (i) were unable to speak or write in fluent English; (ii) could not walk unassisted; (iii) had undergone subsequent hip surgery; or (iv) had concurrent lower back or other lower limb injury. Forty-six controls were recruited from the community through advertisements. Eligibility criteria for controls included (i) no history of hip surgery at any time in the past; (ii) no reported hip pain in the past 6 months; (iii) aged 18–60 years; and (iv) no concurrent lower back or lower limb injury. Controls were recruited from the same community as the hip arthroscopy group and were matched for age, gender, and physical activity levels with hip chondropathy participants.

Procedures

The surgical technique and methods for assessing intra-articular chondropathy were standardised and have been described previously [7, 10]. Briefly, surgical interventions performed for chondropathy included debridement or microfracture as determined to be most appropriate by the surgeon at the time of surgery, based on the location and severity of the chondral lesion. All participants attended a private physiotherapy clinic between 12 and 24 months after hip arthroscopy, where questionnaires were completed and demographic data were collected. Informed written consent was obtained from all participants prior to collecting participant characteristics including height, weight, self-reported physical activity levels and completion of patient-reported outcomes.

Chondropathy diagnosis

The Outerbridge grading system was originally described with reference to macroscopic chondral changes to the patellar surface, but has since been used to identify and grade chondral damage in multiple joints including the knee and hip, where visible chondral changes are categorized into four grades [9]. For this study, participants were grouped to allow for comparisons between mild and severe hip chondropathy (mild chondropathy: Outerbridge grade 1–2; severe chondropathy: Outerbridge grade 3–4).

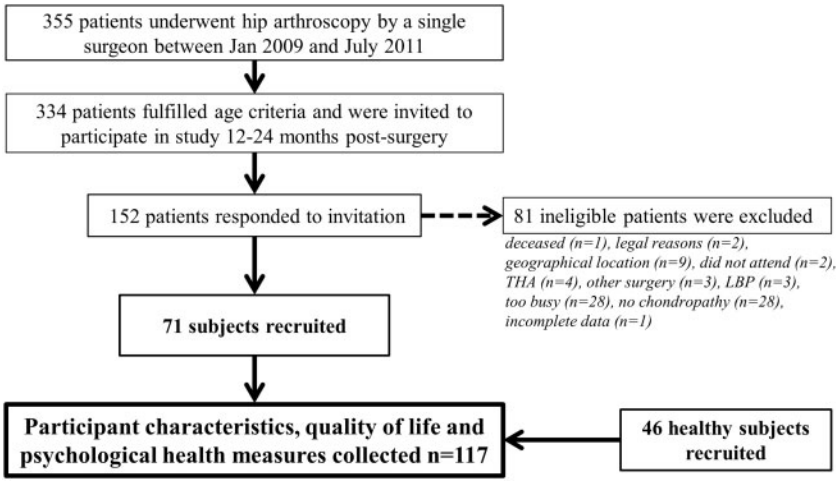

Fig. 1. Participant recruitment flowchart. THA, total hip arthroplasty; LBP, low back pain.

Patient-reported outcomes

The Hip disability and Osteoarthritis Outcome Score (HOOS) and the International Hip Outcome Tool (iHOT-33) were used to assess hip-related QoL. The HOOS is a hip-specific 40-item questionnaire, addressing five domains (pain, symptoms, function in daily living, sports and recreational function and hip-related QoL) [11]. The iHOT-33 was developed as a hip-related QoL measure for use in active patients with hip pathology and has 33 items, across 4 domains (symptoms and functional limitations, sports and recreational physical activities, job-related concerns and social, emotional, and lifestyle concerns) [12]. The HOOS-QOL subscale and iHOT-33 are scored from 0 (extreme problems) to 100 (no problems) and have good psychometric properties for use with postoperative hip arthroscopy patients [11–13].

Health-related QoL was assessed using the EuroQol-5D (EQ-5D) [14, 15]. The EQ-5D contains five dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression) scored from 1 (no problems) to 3 (extreme problems). The second component is a visual analogue scale (VAS) measure of overall health status, this involves drawing a line along a 0–100 scale, where 100 represents the best health state, and 0 represents the worst health state. Anxiety and depression was evaluated using the Hospital Anxiety and Depression Scale (HADS). Higher scores indicate greater impairment, with a maximum score of 21. Scores of 0–7 indicate no impairment, 8–10 borderline depression or anxiety, and 11 or greater suggest the responder has depression or anxiety [16].

Statistical analysis

Data were assessed for normality using the Kolmogorov–Smirnov and Shapiro–Wilk tests. As most data were not normally distributed, non-parametric tests were performed and medians and interquartile ranges (IQR) were reported. The sample size required to detect a difference between the groups was calculated using previously published between-group differences for the IHOT-33 [7]. A total sample of 80 (40 people in each group) was required to determine a between-group difference of 6 points on the IHOT-33 [12] (assuming power = 0.80; significance 0.05). To account for incomplete data and drop-outs, a minimum of 46 people were recruited in each group. All statistical analyses were performed using SPSS Version 18.0 software (SPSS Inc., Chicago, IL), and level of significance was set at 0.05. Mann–Whitney U and Pearson's Chi Square tests were used to explore differences in participant demographics and patient-reported outcomes between groups.

RESULTS

Participant demographics

Seventy-two patients with chondropathy and 46 pain-free controls were recruited into the study. Data were incomplete for one participant and therefore, data from 71 participants following arthroscopic treatment for hip chondroplasty were available for analysis. Of the 71 patients with chondropathy, 51 patients underwent surgical repair or debridement for labral pathology, and 39 patients underwent femoral osteoplasty for cam-type femoroacetabular impingement. Chondropathy patients were evaluated at an average of 17 months (range 12–24 months) post-surgery and had a slightly higher BMI [median (IQR) hip chondropathy 25 (23–28); control 23 (21–26), $P = 0.01$], compared to the control group. Those with severe chondropathy also reported a slightly higher BMI than those with mild chondropathy [26 (24, 31) versus 25 (23, 27),

Table I. Characteristics of chondropathy participants and matched controls

Characteristic	*Chondropathy (n = 71)*	*Pain-free controls (n = 46)*	P *values*	*Mild chondropathy (n = 43)*	*Severe chondropathy (n = 28)*	p *values*
Age (years)	39 (28, 48)	36 (29, 45)	0.57	37 (25, 48)	42 (28-49)	0.45
BMI (kg/m^2)	25 (23, 28)	23(21, 26)	0.01*	25 (23-27)	26 (24-31)	0.047*
Hours physical activity per week[a]	5 (2, 9)	5 (3, 8)	0.43	6 (2, 9)	4 (1, 8)	0.54

All data were reported as median (IQR); *p* values were obtained using Mann–Whitney *U* tests. BMI, body mass index.

[a]Self-reported physical activity was reported based on a response to the question 'How many hours of physical activity did you perform in the last week?' The response was recorded as number of hours.

*$P < 0.05$.

$P = 0.05$]. There were no significant differences in gender distribution (52% of chondropathy patients and 53% of pain-free controls were female), age or physical activity levels (Table I).

Comparison of patient-reported outcomes between hip chondropathy and pain-free controls

As shown in Fig. 2, participants following arthroscopic treatment for hip chondroplasty reported worse outcomes for all HRQoL and hip-related QoL measures, compared with pain-free controls.

EQ-5D

The EQ-5D results are presented in Fig. 3 as the proportion of participants reporting problems for each dimension (defined as a score of 2 or 3). Participants following arthroscopic treatment for hip chondroplasty reported more problems in the dimensions of mobility, usual activities and pain/discomfort, compared with pain-free controls, but no difference in the dimension of self-care ($P = 0.02$) (Fig. 3).

HADS

Participants after arthroscopic treatment for hip chondropathy reported worse depression and anxiety scores compared with pain-free controls [median (IQR) 1 (0–3) versus 0 (0–1), $P = 0.01$ for depression; 2 (0–6) versus 0 (0–3), $P = 0.02$ for anxiety]. Hip chondropathy participants reported higher anxiety scores and similar depression scores to controls (Fig. 4). Anxiety scores ≥ 8 corresponding to borderline anxiety were reported by two people with hip chondropathy (2.9%), and two control participants (4.3%). Scores corresponding to borderline depression (≥ 8) were reported by three people with hip chondropathy (4.3%) and no control participants.

Comparison of patient-reported outcomes between mild and severe hip chondropathy groups

HOOS-QOL

Exploration of the HOOS-QOL items showed that 38% of hip chondropathy participants were aware of their hip problem on a daily basis and almost half modified their lifestyle moderately (22%), severely (21%) or totally (5%) as a result of their hip function. While 19% of participants reported no issues with hip confidence, 45% were mildly troubled and over one third were moderately (21%), severely (12%) or extremely (3%) troubled with a lack of hip confidence. Mild (53%) or moderate (20%) hip-related difficulties were reported by most participants. Comparisons between mild and severe chondropathy participants revealed greater trouble with hip confidence in those with severe chondropathy ($P = 0.04$) (Table II).

iHOT-33

Seven iHOT-33 items were significantly more impaired in those with severe chondropathy compared with mild chondropathy (Table III). The greatest difference was observed for question 19 (how concerned are you that pain in your hip will increase if you participate in sports/recreational activities?) where the severe chondropathy group reported a median score 40 points lower than the mild chondropathy group ($P = 0.01$, Table III).

EQ-5D

The percentage of participants reporting problems for each EQ-5D dimension are presented in Fig. 5. There were no significant differences in EQ-5D dimension scores between the mild and severe chondropathy groups.

HADS

There were no significant differences in rates of anxiety and depression (scores ≥ 8) between participants with mild and severe chondropathy (Fig. 6). In participants with

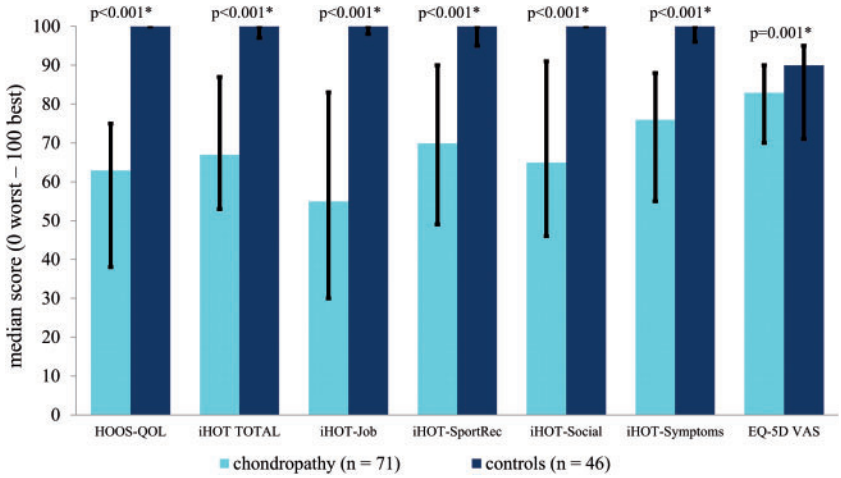

Fig. 2. Comparison of patient reported outcomes in people with hip chondropathy versus pain-free controls. All outcomes were reported as median, and error bars represent interquartile range (IQR); 100 represents a best possible score for each outcome; *P* values were obtained using Mann–Whitney U tests; $^*p < 0.05$; the EQ-5D VAS was completed by $n = 57$ chondropathy participants and $n = 33$ pain-free controls; HOOS = Hip disability and Osteoarthritis Outcome Score; iHOT = International Hip Outcome Tool; EQ-5D = EuroQol-5D.

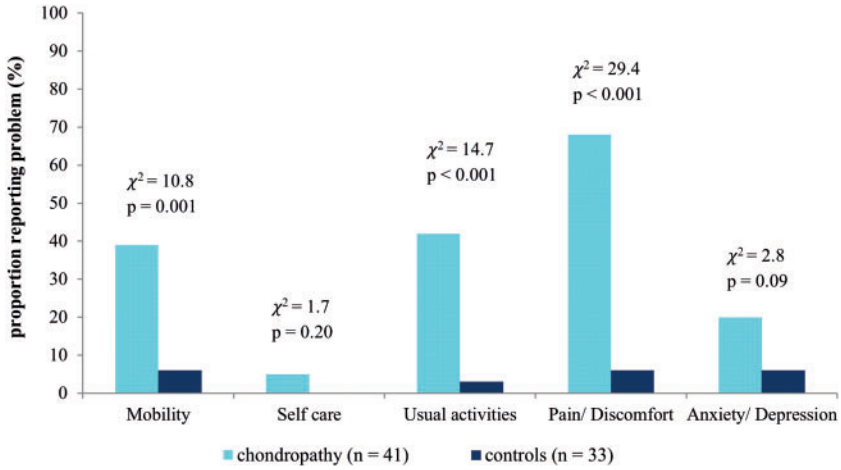

Fig. 3. Proportion of participants reporting problems for each EQ-5D dimension. A Pearson's Chi Square test (χ^2) was used to evaluate whether people with hip chondropathy report more problems than controls in each EQ-5D domain.

mild chondropathy, scores $\geq$8 corresponding to borderline anxiety were reported by two participants (4.8%), and scores corresponding to borderline depression were reported by three people with mild chondropathy (7.1%). No participants with severe chondropathy reported scores corresponding to borderline depression or anxiety.

DISCUSSION

People with hip chondropathy had worse HRQoL 1–2 years following hip arthroscopy and reported more anxiety symptoms compared with age-matched controls. Furthermore, participants with severe hip chondropathy reported more trouble with hip confidence, more concern regarding hip pain during sport or recreational activity, more pain after activity, and limitations maintaining desired fitness levels compared to people with mild chondropathy.

Comparison of hip-related QoL between chondropathy patients and age-matched pain-free controls showed significant impairments in HOOS-QOL and iHOT-33 scores for people with chondropathy. Further exploration of iHOT-33 items revealed that severe chondropathy was associated with more frequent hip or groin ache, more pain after activity, difficulty walking long distances and lying on the

Table II.Comparison of HOOS-QOL item scores for mild chondropathy versus severe chondropathy

	Dichotomised item scores (0–1 versus 2–5)	*Mild chondropathy (n = 43)*	*Severe chondropathy (n = 28)*	p *values**
HOOS Q1	Never-to-monthly	$n = 13$ (30%)	$n = 6$ (21%)	0.41
Hip awareness	Weekly-to-constant	$n = 30$ (70%)	$n = 22$ (79%)	
HOOS Q2	None-to-mild	$n = 22$ (51%)	$n = 10$ (38%)	0.20
Hip-related lifestyle modification	Moderate-to-total	$n = 21$ (49%)	$n = 18$ (64%)	
HOOS Q3	None-to-mild	$n = 29$ (67%)	$n = 12$ (43%)	**0.04**
Trouble with hip confidence	Moderate-to-extreme	$n = 14$ (33%)	$n = 16$ (57%)	
HOOS Q4	None-to-mild	$n = 31$ (72%)	$n = 14$ (50%)	0.06
Hip-related difficulty	Moderate-to-extreme	$n = 12$ (28%)	$n = 14$ (50%)	

HOOS-QOL items were dichotomised into the best two responses (0–1), and the worst three responses (2–5); HOOS, Hip Osteoarthritis Outcome Score. All data are presented as median (IQR).

*p values obtained from Pearson's Chi Square test; $P < 0.05$ is highlighted in bold.

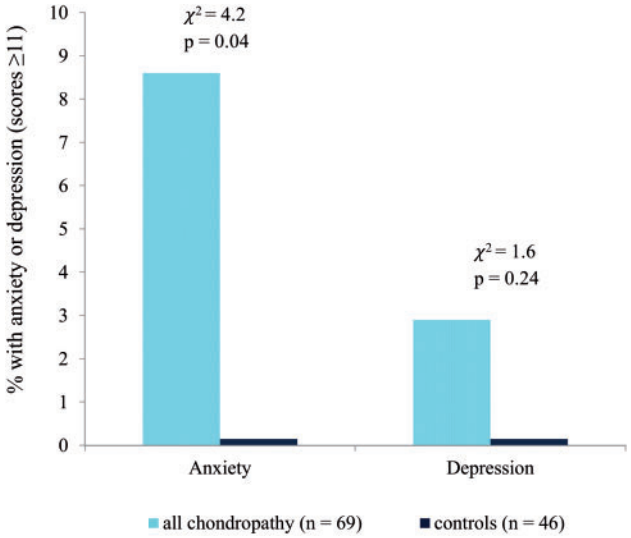

Fig. 4. Percentage of mild and severe chondropathy patients with anxiety or depression. Scores of 0–7 indicate no impairment, 8–10 borderline depression or anxiety, and 11 or greater suggest the participant has depression or anxiety; A Pearson's Chi Square test (χ^2) was used to evaluate whether people with hip chondropathy report more anxiety and depression (scores $\geq$ 11) than controls. Two chondropathy participants (one mild chondropathy and one severe chondropathy participant) were excluded from analysis due to missing responses.

affected side. Clinically, these physical symptoms may reflect chondropathy progression or the early stages of OA. A slightly higher BMI in participants with severe hip chondropathy may be partly explained by greater difficulties with physical activity and walking long distances. Further research including pre-operative BMI measures would be required to explore this potential relationship. Additionally, patients with severe chondropathy at the time of hip arthroscopy experienced greater issues with hip-related confidence 1–2 years later, compared with patients with mild chondropathy at the time of surgery. A recent study reported mean preoperative HOOS-QOL values of 39 $\pm$ 10 in participants aged 25–57 years, which increased to 64 $\pm$ 24 at a mean 45 months following hip arthroscopy.[17] These post-operative scores are similar to the median HOOS-QOL score reported by participants in our study at 12–24 month follow-up (63 IQR: 38, 75). Taken together, these findings suggest that hip-related QoL is impaired in preoperative hip arthroscopy populations, and despite considerable improvement ($>$25 points) this may remain substantially impaired in the first 4 years following surgery in those with hip chondropathy. These results also suggest that patients with more severe hip chondropathy would benefit from management strategies targeting hip-related frustrations and concerns regarding sport, recreation and fitness and addressing troubles with hip confidence.

Notably, investigating individual item responses was necessary to identify specific limitations contributing to reported differences in hip-related QoL between mild and severe chondropathy groups. Quality of life instruments should consider the value and importance that the respondent places on each item [18], as the inability to perform a particular task, or the presence of a particular symptom, does not necessarily impact negatively on an individual's HRQoL. Many factors can impact on an

Table III. Comparison of iHOT-33 item scores for mild chondropathy versus severe chondropathy

iHOT-33 items	*Mild chondropathy*	*Severe chondropathy*	P*
iHOT-33 Symptoms and functional limitations			
Q1 How often does your hip/groin ache?	70 (40, 80)	50 (20, 75)	**0.03**
Q2 How stiff is your hip as a result of sitting/resting during the day?	75 (45, 85)	50 (25, 80)	0.05
Q3 How difficult is it for you to walk long distances?	85 (70, 95)	60 (30, 85)	**0.04**
Q4 How much pain do you have in your hip while sitting?	85 (65, 98)	75 (35, 95)	0.30
Q5 How much trouble do you have standing on your feet for long periods of time?	80 (60, 90)	70 (40, 90)	0.22
Q6 How difficult is it for you to get up and down off the floor/ground?	80 (60, 95)	70 (40, 95)	0.38
Q7 How difficult is it for you to walk on uneven surfaces?	80 (60, 95)	70 (40, 95)	0.15
Q8 How difficult is it for you to lie on your affected hip side?	85 (70, 100)	70 (30, 95)	**0.04**
Q9 How much trouble do you have with stepping over obstacles?	80 (70, 95)	75 (40, 95)	0.06
Q10 How much trouble do you have with climbing up/down stairs?	90 (60, 100)	70 (50, 95)	0.05
Q11 How much trouble do you have with rising from a sitting position?	85 (70, 95)	75 (50, 95)	0.19
Q12 How much discomfort do you have with taking long strides?	83 (75, 95)	73 (55, 95)	0.05
Q13 How much difficulty do you have with getting into and/or out of a car?	85 (65, 95)	75 (50, 95)	0.28
Q14 How much trouble do you have with grinding, catching or clicking in your hip?	80 (60, 95)	75 (50, 95)	0.10
Q15 How much difficulty do you have with putting on/taking off socks/stockings/shoes?	90 (75, 95)	80 (50, 95)	0.26
Q16 Overall, how much pain do you have in your hip/groin?	75 (60, 90)	65 (40, 80)	0.10
iHOT-33 Sports and recreational activities			
Q17 How concerned are you about your ability to maintain your desired fitness level?	75 (35, 85)	30 (10, 70)	**0.02**
Q18 How much pain do you experience in your hip after activity?	75 (50, 90)	40 (20, 75)	**0.01**
Q19 How concerned are you that hip pain will increase if you participate in sports/rec activities?	60 (25, 90)	20 (5, 80)	**0.01**
Q20 How much has your quality of life deteriorated because you cannot participate in sport/rec activity?	85 (45, 95)	60 (20, 85)	**0.04**

(continued)

Table III. . Continued

iHOT-33 items	*Mild chondropathy*	*Severe chondropathy*	P*
Q21 How concerned are you about cutting/changing directions during your sport or recreational activities?	55 (20, 80)	48 (11, 59)	0.31
Q22 How much has your performance level decreased in your sport or recreational activities?	70 (30, 84)	48 (19, 88)	0.28
iHOT-33 Job related concerns			
Q23 How much trouble do you have pushing/pulling/lifting or carrying heavy objects at work?	80 (64, 96)	80 (40, 93)	0.40
Q24 How much trouble do you have with crouching/squatting?	75 (45, 95)	63 (25, 83)	0.07
Q25 How concerned are you that your job will make your hip worse?	75 (38, 96)	50 (23, 95)	0.21
Q26 How much difficulty do you have at work because of reduced hip mobility?	85 (59, 95)	80 (38, 95)	0.29
iHOT-33 Social, emotional and lifestyle concerns:			
Q27 How frustrated are you because of your hip problem?	75 (25, 90)	35 (15, 90)	0.15
Q28 How much trouble do you have with sexual activity because of your hip?	78 (49, 91)	75 (40, 90)	0.64
Q29 How much of a distraction is your hip problem?	75 (40, 90)	40 (30, 80)	0.05
Q30 How difficult is it for you to release tension and stress because of your hip problem?	85 (65, 95)	80 (45, 95)	0.49
Q31 How discouraged are you because of your hip problem?	80 (50, 95)	80 (40, 95)	0.84
Q32 How concerned are you about picking up or carrying children because of your hip?	95 (73, 100)	80 (24, 96)	0.10
Q33 How much of the time are you aware of the disability in your hip?	70 (25, 90)	40 (20, 90)	0.19

All data are presented as median (IQR); *p values obtained from Mann–Whitney U test; P values < 0.05 are highlighted in bold.

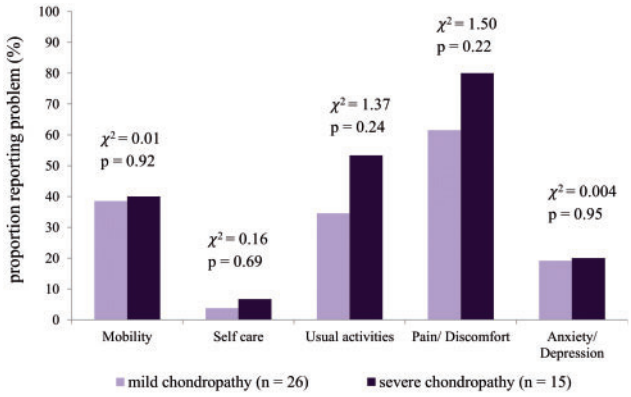

Fig. 5. Proportion of participants reporting problems for each EQ-5D dimension. A Pearson's Chi Square test (χ^2) was used to evaluate whether people with mild chondropathy report more problems (defined as a score of 2 or 3) than people with severe chondropathy in each EQ-5D domain.

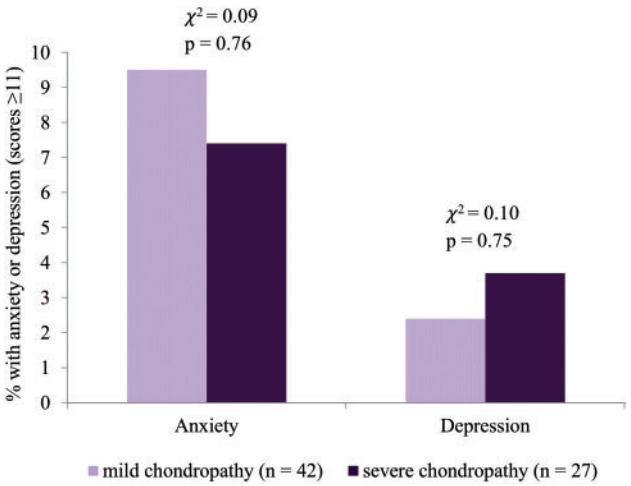

Fig. 6. Percentage of mild and severe chondropathy patients with anxiety or depression. Scores of 0–7 indicate no impairment, 8–10 borderline depression or anxiety, and 11 or greater suggest the participant has depression or anxiety; A Pearson's Chi Square test (χ^2) was used to evaluate whether people with mild chondropathy report more anxiety and depression (scores $\geq$ 11) than people with severe chondropathy. Two participants (one mild chondropathy and one severe chondropathy participant) were excluded from analysis due to missing response.

individual's assessment of their HRQoL [19] yet the majority of items in patient-reported outcome measures do not allow for respondents to directly evaluate their HRQoL [20]. For this reason, differences in individual item responses were explored. Ten of the iHOT-33 items included emotive words (such as; 'how *concerned* are you about . . . ' or 'how *frustrated* are you because of.') or pertained directly to HRQoL ('how much has your *quality of life* deteriorated.'). These items place a functional task or physical symptom within an emotional context and use direct wording that enables the respondent to evaluate the importance and impact of each question on their life quality. Study participants with severe chondropathy at the time of arthroscopy, reported greater concern that hip pain would increase with activity, greater concern with maintaining desired fitness and more deterioration in QoL due to sport/recreation participation restrictions 1–2 years later, compared to those with milder chondropathy. This supports our finding that hip-related QoL is more impaired in those with severe chondropathy.

Furthermore, the findings of this study indicate that the severity of chondropathy has an impact on young and middle aged people being able to participate in sport and physical activity without difficulty. Therefore, it is important that strategies are formulated to improve the ability of people with hip chondropathy to participate in greater levels of physical activity. Furthermore, poor hip confidence and exercise limitations may be related to our previous reports of impaired hip strength, range of motion and balance after arthroscopic surgery in individuals with hip chondropathy compared to those without [21]. This suggests that rehabilitation programs should incorporate both psychological and physical strategies to improve QoL outcomes following hip arthroscopy in people with chondropathy [22, 23].

Limitations

There are a number of limitations in this study that should be acknowledged. Firstly, this study was cross-sectional, and did not examine pre-operative to post-operative change in HRQoL among patients undergoing hip arthroscopy. Future prospective longitudinal studies may examine this. Secondly, there is a possibility of inclusion bias, as this study did not include a group of patients with hip chondropathy who did not have hip arthroscopy. In addition, only patients from a single surgeon were included. These aspects of study design may reduce the generalizability of our findings. Thirdly, participants were not grouped based on the surgical intervention performed. This grouping was chosen for two reasons: we were interested in the relationship between chondropathy (rather than the surgical procedure performed) and HRQoL, and the sample size did not allow further subgroup analysis. Unfortunately, we did not have the resources to obtain radiographs or MRIs in our pain-free control group; consequently we could not determine whether the pain-free control group had structural chondral pathology. The only generic HRQoL measure used for this study was the EQ-5D. Although this instrument identified some differences between chondropathy

patients and matched pain-free controls, it did not identify any differences in HRQoL between the mild and severe chondropathy groups. This may be partly explained by the large ceiling effect, where over one-third of chondropathy patients reported the maximum possible EQ-5D score. This suggests that this instrument is not ideal for future evaluations of HRQoL in hip arthroscopy populations (where patients are commonly young and active) and a joint-specific measure may be more appropriate [24].

The number of participants in the severe chondropathy group was small ($n = 28$), and may have therefore been underpowered to detect a difference between the groups. Despite this, differences were detected between the groups for a number of measures of HRQoL. Future studies should include larger groups in order to confirm the findings of this study, and possibly detect additional differences between groups. Furthermore, a relatively small number ($n = 152$) of participants responded to the invitation to take part in the study, from the possible pool ($n = 334$) of participants. This introduces the possibility of inclusion bias, where only participants with a particularly good, or particularly poor outcome may have responded to the invitation. In order to overcome this limitation, future prospective cohort studies are required, where patients are recruited pre-operatively and the followed up post-operatively regardless of outcome. Finally, the Outerbridge classification is an imperfect measure of chondropathy [25], with potentially poor inter-rater reliability. In order to overcome this limitation, hip arthroscopy patients for this study were recruited from a single surgeon only. In addition, the surgeon is a high volume, fellowship trained hip arthroscopist with up to 10 years' experience using this system of classification. The Outerbridge classification system was the most appropriate classification system at the time the study commenced, and it has been used widely in the literature, including our previous study where between-group differences in patient-reported outcome were reported [7].

In conclusion, participants after arthroscopic treatment for hip chondropathy had significantly poorer HRQoL and greater anxiety 12–24 months following surgery, compared with age-matched pain-free controls. These findings highlight the substantial personal burden of this condition. Additionally, patients with severe hip chondropathy reported greater impairment in hip-related QoL due to poor hip confidence, participation restrictions, difficulty maintaining fitness, and greater concern about pain during sport or recreational activities, compared to those with mild chondropathy. These findings may be used to guide the development of targeted interventions aimed at optimising HRQoL for younger people with hip chondropathy.

Clinical messages

- Quality of life is impaired 12–24 months after hip arthroscopy in people with hip chondropathy
- Severe chondropathy has a greater impact on QoL than mild chondropathy
- Rehabilitation and education strategies aimed at improving hip-related QoL should address physical activity limitations in people with severe chondropathy.

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CONFLICT OF INTEREST STATEMENT

None declared.

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