



Journal club: 10 April 2013

Chairmen: Mr A Ajuied & Mr Z Shah

Convener: Mr I Findlay

Guy's and St. Thomas' Hospitals NHS Trust

Theme: Return to Sport after Total Joint Arthroplasty

1. **Wylde V, Blom A, Dieppe P, Hewlett S, Learmonth I.** Return to sport after joint replacement. *J Bone Joint Surg [Br]* 2008;90-B:920-3.

Reviewer: Mr Roland Walker

Background

As patients remain fitter and more active in older life there is increasing demand to establish whether it is possible to return to sport following lower limb arthroplasty. There is also considerable variability in the advice given to arthroplasty patients about return to sport by orthopaedic surgeons, physiotherapists and general practitioners.

Aims

The aim was to establish the rate of return to sports following one of 5 common lower limb arthroplasty procedures.

Methods

Patients who had undergone total hip replacement, hip resurfacing, total knee replacement, unicompartmental knee replacement or patellar resurfacing over a two year period at the Avon Orthopaedic Centre were identified retrospectively. A postal survey was used to question living patients. The minimum duration post-surgery was 1 year, and the maximum was 3 years. In patients with subsequent joint replacements, the questionnaire referred to their first procedure only. Patients who had taken part in sport in the 3 years prior to their surgery were asked whether they had returned to sport and if not, the reasons why. Patients were asked to complete a Western Ontario McMasters Osteoarthritis Index (WOMAC) pain and function score to assess their outcome. Questionnaires were sent to 3125 patients, of whom 2085 (66.7%) responded. Of these, 911 had THR, 157 hip resurfacing, 866 TKR, 100 UKR and 51 patellar resurfacing.

Results

In the 3 years before their joint replacement, 726 patients (34.8%) participated in one or more sporting activities. Pre-operatively, participation in sport declined with age and was significantly higher in men than in women (43% vs 29% respectively). Patients who went on to have hip

resurfacing were the most active pre-operatively, with 64.3% participating in one or more sports. The lowest rate of participation (29.2%) was in patients who had a TKR. Of the 726 patients who participated in sports pre-operatively, 446 (61.4%) had returned to their pre-operative activities by 1 to 3 years after operation. Of the 280 (38.6%) patients who had been unable to return to sport, 192 had not resumed participation because of their joint replacement, representing 26.4% of those who had undertaken sports pre-operatively. Medical advice accounted for 12% of the reasons why patients had not returned to sport. The largest decline was in high-impact sports. Whereas age had no significant effect on return to sport, the odds for men returning to sport were 1.8 times greater than those for women. There was no significant difference in a return to sport according to the type of operation.

Paper's Conclusions

34.8% of patients were active in sport in the 3 years before joint replacement. At 1 to 3 years after operation, 26.4% of these patients were unable to return to sport because of reasons related to the joint replacement, most commonly pain.

Appraisal

The response rate is acceptable for this type of study.

The study misses a huge opportunity to discover whether patients took up a new or long since retired sports following their arthroplasty. This may have offset some of those who failed to return to sport.

The maximum possible duration from time of last sporting activity to time of questioning in this study was 6 years. The authors state that sporting activity declined with age pre-operatively, however natural decline in sporting activity over the potentially long study period was not discussed and no age-adjustment was made in the headline results. This potentially creates bias, by overstating the decline in sporting participation following arthroplasty.

The hip resurfacing group in this study were very different demographically to the rest of the participants, being approximately 16 years younger than the total hip replacement group, and much more likely to be male and therefore more likely to do sport on both counts. This group are likely to have very different physical demands and expectations to the other patients. Therefore, despite controlling for age and gender, it is impossible to draw conclusion that hip resurfacing confers no advantage over total hip replacement in terms of return to sport, from the methodology and data provided.

The WOMAC score bears no relevance to sporting performance and there are other sport-specific patient reported outcomes measures that would have been more useful.

Overall there are numerous methodological flaws in this study, and therefore it is very difficult to draw any meaningful conclusion from it. The paper poses a very useful question and serves to stimulate further investigation.

Recommendations for our practice

Based on this paper it is fair to advise patients taking part in sport that a majority will return to sport by between 1 and 3 years post-operation, however a substantial minority will not, as a direct result of their replaced joint.

2. **Healy WL, Sharma S, Schwartz B, Iorio R.** Athletic activity after total joint arthroplasty. *J Bone Joint Surg [Am]* 2008;90-A:2245-52

Reviewer: Mr Sarvpreet Singh

Background

Current concept review of athletic activity after Total Joint Arthroplasty, summary of what's been published and opinion of Hip & Knee Society.

Aims

Aims to bring the practising orthopaedic surgeons up to speed with regards to the evidence in literature about athletic activity after total joint arthroplasty.

Methods

Level III, Current Concept Review and opinion of respected societies in the field.

Results

As it's a review paper so no statistics.

Paper's Conclusions

Paper summarises the literature and urges the Orthopaedic surgeons to inform their patients about the evidence published and give sensible advice to their patients.

Good attempt to bring together all the evidence, written in uncomplicated jargon.

Recommendations for our Practice

To give patients evidence based advice.

3. **Jackson JD, Smith J, Shah JP, Wisniewski SJ, Dahm DL.** Golf after total knee arthroplasty: do patients return to walking the course? *Am J Sports Med* 2009;37:2201-4.

Reviewer: Mr Gev Bhabra

Background

Previous studies have shown that patients who have had total knee arthroplasty have the potential to increase physical activity with subsequent benefits to cardiovascular fitness. Golf is a popular sport and is relatively low impact. It has been reported that the average walking golfer takes around 11000 steps per round. The knee society has listed Golf as a recommended activity after TKA.

The authors sent postal questionnaires to patients that had undergone total knee replacement and were identified as "active golfers" to determine whether and how quickly they returned to playing golf, and whether they now walked the course.

Paper's Aims

To perform a postal questionnaire to address the hypothesis that total knee replacement surgery decreases pain to allow an increased ability to participate in golf, and allows a large percentage of patients to walk the golf course.

Paper's Methods

The authors performed a postal questionnaire on a series of consecutive patients. This is a case series and represents level 4 evidence.

1630 consecutive patients that had undergone primary posterior cruciate substituting PFC Sigma total knee replacement between 1995 and 2000 were identified as part of a larger study being undertaken at the Mayo clinic. These patients were all sent a questionnaire which incorporated the UCLA activity score and the knee society score. 1206 (74%) responded to this survey and from this 249 patients identified themselves as "active golfers", participating in golf at the time of survey completion. The authors excluded patients who had bilateral TKRs, patients who had revision TKRs and deceased patients, leaving 151 patients. These patients were then sent a second survey to establish their ability to participate in golf.

This second survey focused on the following points:

1. How much the patients played golf before and after surgery
2. Time taken to return to playing golf after surgery
3. Pain whilst playing golf before and after surgery
4. Golfing ability before and after surgery
5. Whether the patients walked the course or used a cart
6. Advice received regarding walking and playing golf after surgery

In an attempt to increase the response rate, non responders were sent a follow up survey and patients who did not respond to the second follow up survey received a phone call.

Results

93 of the 151 patients responded to the survey giving a response rate of 62%. These were a fairly homogenous group with an average age of 66 years (range 44-79), 8.7 years following surgery (range 6.4 – 12.1) and 80% were male.

81% said that they played as much or more golf after TKA than they played before surgery. 57% had returned to playing golf by 6 months, 77% by 9 months and 85% by 12 months. 83% claimed to have no pain whilst playing golf after surgery, whilst 87% had some pain whilst playing golf before surgery. In general the patients did not report a reduction in golfing ability after surgery; 79% played with the same handicap or lower, and 84% could drive as far or further.

Despite these positive results, only 14% of patients actually walked the course after surgery, the rest used a cart. Before surgery, 28% walked the course. There was no correlation between the patients who did not walk the course and those that had concurrent other orthopaedic conditions ($p=0.35$). Of the 31% of patients that received some advice regarding playing golf after surgery, 59% were advised to restrict walking and to use a cart when playing golf. However, neither was there any correlation between walking the course after surgery and advice received ($p=0.68$).

Paper's Conclusions

The authors conclude that TKA provides good relief of pain allowing most patients to return to playing and enjoying golf within 12 months, at a similar level to that played before surgery. They note that these results are similar to those previously reported by Mallon and Callaghan in 1993, where 84% of patients reported no pain whilst playing golf after TKA. They are, however, concerned by the low number of patients that walked the course after surgery, and the high number of patients that received advice to restrict walking and to use a cart whilst playing golf.

The authors comment that there is good evidence to support improvements in cardiovascular fitness after TKA. They claim there is no strong evidence to suggest that walking the golf course is detrimental to the longevity of knee implants. They recognise one of two recent biomechanical studies (1-2) that suggest high rotational stresses are placed on TKA implants during the golf swing, but conclude that if patients are to play golf, they should not be discouraged from walking the course.

The authors do acknowledge the major weaknesses of their study which are the moderate response rate and the potential for recall bias when asking patients to recall their activities before surgery. However, they argue that this should not weaken their primary findings which are that that most

patients return to playing golf, but that many do not walk the course. The reason that most patients use a golf cart after TKA is not clear from this study.

Appraisal

Golf is a popular sport enjoyed by many and return to sports is a common subject patients ask about in the outpatient clinics. This paper helps to advise patients that approximately 80% of patients get pain relief after TKA and return to playing golf within 12 months of surgery.

Despite the authors' persuasive recommendations that patients should be encouraged to walk the golf course, this paper does not address the question of implant longevity with increased activity. The authors' suggestions that there is no evidence in the literature to suggest that walking the course has a detrimental effect on implant longevity may be debated. In 2001 a retrieval analysis of 28 TKA implants suggested increased linear wear rates with increased activity (3). Increased activity levels have also been correlated with increased linear wear rates in metal-on-polyethylene hip replacements (4-5). There is also evidence to suggest high rotational stresses placed on TKA implants during the golf swing (1-2). The authors do accept that there is a need for further research to determine the effects of golf on implant longevity, and we therefore believe that it is difficult to advise patients that there is no evidence to suggest that playing golf might affect implant longevity. There was a reasonable attempt made to improve the response rate in this study. However, the potential for recall bias remains an important weakness in the methodology.

Recommendations for our Practice

When counselling patients in outpatient clinics, we can present the current available evidence. We would advise that this study supports previous research in showing that about 80% of patients have reduced pain after TKA and return to playing golf within 12 months. There is no clear evidence as to the potential detrimental effects playing golf might have on implant longevity, but other studies have shown improvements in cardiovascular fitness with increased activity after TKA.

1. Hamai S, Miura H, Higaki H, Shimoto T, Matsuda S, Okazaki K, et al. Three-dimensional knee joint kinematics during golf swing and stationary cycling after total knee arthroplasty. *J Orthop Res*. 2008 Dec;26(12):1556-61.
2. D'Lima DD, Steklov N, Patil S, Colwell CW, Jr. The Mark Coventry Award: in vivo knee forces during recreation and exercise after knee arthroplasty. *Clin Orthop Relat Res*. 2008 Nov;466(11):2605-11.
3. Lavernia CJ, Sierra RJ, Hungerford DS, Krackow K. Activity level and wear in total knee arthroplasty: a study of autopsy retrieved specimens. *J Arthroplasty*. 2001 Jun;16(4):446-53.
4. Schmalzried TP, Shepherd EF, Dorey FJ, Jackson WO, dela Rosa M, Fa'vae F, et al. The John Charnley Award. Wear is a function of use, not time. *Clin Orthop Relat Res*. 2000 Dec(381):36-46.
5. Flugsrud GB, Nordsletten L, Espehaug B, Havelin LI, Meyer HE. The effect of middle-age body weight and physical activity on the risk of early revision hip arthroplasty: a cohort study of 1,535 individuals. *Acta Orthop*. 2007 Feb;78(1):99-107.

4. Williams DH, Greidanus NV, Masri BA, Duncan CP, Garbuz DS. Predictors of participation in sports after hip and knee arthroplasty. *Clin Orthop Relat Res* 2012;470:555-61

Reviewer: Mr Christian Smith

Background

Advances in the design, engineering and biomaterials of hip and knee arthroplasty have improved their longevity. As a result younger more active patients can be considered for total joint arthroplasty due to lower revision rates because of failure from aseptic loosening. Younger patients

often have higher expectations about function post operatively, including the opportunity to participate in sports. Previous studies have shown high level of return to sports after arthroplasty, but there has been no control for patient related factors. The UCLA Activity Rating Scale is a quantitative assessment of activity after total hip and knee arthroplasty and has been validated in a clinical setting and ranges from 1 (inactive) to 10 (high impact sports).

Aims

The primary aim was to measure sports participation at 1 year after hip or knee arthroplasty. The secondary objective was to explore variables which may influence the prediction of activity post operatively.

Methods

This paper is a retrospective cohort observational study which was ethically approved. Using a longitudinal database analysis of all patients who had resurfacing hip arthroplasty, total hip arthroplasty (primary or revision) or total knee arthroplasty (unicondylar or bicondylar, primary or revision) identified 736 patients from the 2873 patients operated on over a 26 month period. These patients all had a pre-operative UCLA score and a post-operative UCLA score at 1 year follow up. The variable investigated as predictors for greater activity were the 4 different operating surgeons, Charnley classification of active comorbidity, WOMAC, Oxford hip score, SF-12 and UCLA questionnaire completed pre op and at 1 year, patient characteristics (age, gender and BMI) and operative details such as bearing surface and whether the operation was an index procedure or revision. A regression model was used to assess predictors of activity with the UCLA score as the dependent variable. Odds ratios and 95% confidence intervals were calculated for covariates, patient demographics and surgical parameters. A t-test was used to analyse the function scoring systems.

Results

Of the 736 patients 360 were male and 376 were female. The mean age was 64.5 with an age range of 25-93. Pre operatively 12.3% of patients achieved a UCLA score of 7 (representing the ability to cycle) or greater. At 1 year post op 37.2% of patients achieved a UCLA score of 7 or more. All patients had an improvement in their quality of life scores at 1 year ($P < 0.001$).

Independent predictors of higher post op UCLA scores in all forms of interventions are higher pre op UCLA scores, younger age, male gender and lower BMI. The WOMAC score was also predictive in patients who underwent total hip arthroplasty only, but not knee arthroplasty.

Non-predictive factors for improved activity after arthroplasty were Charnley classification, WOMAC, OHS, SF-12, surgeon, type of operation and bearing surface and its diameter.

Paper's Conclusions

This paper utilised a large cohort in a single centre study. Only 26% of patients operated on in the time frame were eligible for the study as they did not complete a pre-op and post-op UCLA score. Other studies which did not use the UCLA score show a large decline in high impact sports participation post-operatively, THA fared better than TKA and HRA and UKA helped maintain higher levels of physical activity. Studies that did utilise the UCLA score had a median score of 6 in THA and TKA patients at 3 years, a mean score of 6 in 41 patients at 8 years and a mean score of 7.1 in 1630 at 5.7 years.

Appraisal

This observational cohort study of 736 patients is level 4 evidence. There was no randomisation of treatment, power calculation or control group. Almost three quarters of the patients operated on in the given time frame were ineligible to be included in the study due to lack of UCLA scores. This

represents a large possible bias as more motivated patients are more likely to persevere with rehabilitation or physiotherapy and attend follow up appointments. These patients may try harder to return to sporting activities and so represent a cohort of patients with a disproportionately high level of sporting participation post operatively compared to the database used as a whole. The study only followed up patients at 1 year and so had no mid- or long-term results.

Although the study achieved its aim there are large numbers of confounding factors that may invalidate the results and conclusions of the study. In spite of this, the stated results actually add very little to the current knowledge base.

Recommendations for our Practice

Manage patient expectations appropriately pre-operatively.