

# Arthroscopic joint lavage in osteoarthritis of the knee

## Is it effective?

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### ABSTRACT

**الأهداف:** تقييم مدى فائدة عملية تنظيف وغسيل مفصل الركبة بالمنظار (OAK).

**الطريقة:** شملت هذه الدراسة 150 مريض أجريت لهم عملية تنظيف وغسيل مفصل الركبة (OAK)، خلال الفترة ما بين يناير 2001 وحتى ديسمبر 2006م، في مستشفى الملك فهد الجامعي - الخبر - المملكة العربية السعودية. تم تقييم المرضى سريريا (إكلينيكيًا) باستخدام مقياس ليكوسني المعدل (MLG). تم أخذ أشعة أمامية، خلفية وجانبية للمرضى وهم واقفين وكذلك أشعة سكاى لاين للصابونة، وتم تقييم درجة الاهتراء للركبة باستخدام معيار كلجرين ولورنس (KLG)، وعن طريق المنظار تم تقييم درجة الاهتراء للركبة باستخدام معيار أوتربريدج. تم تنظيف وغسيل الركبة في كل عملية بثلاث لترات من المحلول ثم حك وتنظيف الأنسجة المهترئة. تمت متابعة المرضى وتقييم مدى استفادتهم بعد العملية بـ 6 أشهر، عام، وعامين، وذلك باستخدام نفس المقياس الذي استخدم قبل العملية (مقياس ليكوسني المعدل) (MLG). تم إدخال المعلومات في قاعدة (OC) وتحليلها باستخدام برنامج (SPSS).

**النتائج:** تم التمكن من تحليل وتقييم حالة 107 مريض. كان هناك 55 مريضاً من ذكورا و25 من الإناث، متوسط العمر  $51 \pm 9.3$  عام. كان معدل فترة المراجعة 39.45. كان تقييم مقياس ليكوسني المعدل (MLG) لما قبل العملية كان  $4.1 \pm 14.2$ ، بعد 6 أشهر 7.39، بعد 12 أشهر  $7.75 \pm 0.37$ ، مما يوضح تحسن حالة المرضى من ستة أشهر فما بعد. كان تقييم كلجرين ولورنس (KLG) وتصنيف أوتربريدج أدنى عند من هم أقل في العمر ( $\leq 50$ ) عام مقارنة مع من هم أكبر ( $\geq 51$ ) ( $p=0.05$ ). كانت نتائج 71% من المرضى مرضية، بينما لم يحدث أية تحسن في 12 مريض (11.2%).

**خاتمة:** عملية تنظيف وكحت الركبة (OAK)، لها فوائد في تخفيف الألم وتحسن حركة المفصل. نحن نعتقد أنه يفضل إجراء هذه العملية لمرضى احتكاك الركبة لتخفيف الألم وتأخير الحاجة لعملية تبديل المفصل.

**Objectives:** To assess the benefits of arthroscopic washout in osteoarthritis of the knee (OAK).

**Methods:** One hundred and fifty patients who underwent arthroscopic washout for early OAK

between January 2001 and December 2006, at the King Fahd University Hospital, Al-Khobar, Kingdom of Saudi Arabia were analyzed. Preoperative assessment of patients included clinical assessment by modified Lequesne grading (MLG), antero-posterior and lateral radiographs of weight bearing of knee joints and the skyline view of the patella, and was graded by Kellegren and Lawrence grading (KLG). Arthroscopically, the knee joint was graded by Outerbridge classification (OC). The data were entered in the database and analyzed using the Statistical Package for Social Sciences version 14.

**Results:** One-hundred and seven patients were analyzed. Fifty-five patients were males and 52 were females, with a mean age of  $51 \pm 9.3$  years. The mean follow up was 39.45 months. Preoperative MLG was  $4.1 \pm 14.2$ , at 6 months it was 7.39, and at 12 months was  $7.75 \pm 0.37$ , which improved from 6 months onwards ( $p=0.001$ ). Kellgren and Lawrence grading and OC were significantly lower in younger patients (age  $\leq 50$ ) as compared to older patients ( $\geq 51$  years) ( $p=0.05$ ). Seventy-one percent of our patients had excellent and satisfactory results, and 12 (11.2%) had no improvement.

**Conclusion:** Arthroscopic joint debridement has benefits in the extent of pain relief and improvement of joint mobility. We believe that this procedure should be carried out in patients with OA for pain relief and delay of definite arthroplasty.

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Osteoarthritis (OA) is a degenerative aging process affecting any joint of the body, but the weight bearing joints, such as the knee and the hip, are most commonly affected. The prevalence of OA of the knee is unknown, but recently it was estimated that 12.5% of the general population aged >45 years suffer from OA of the knee.<sup>1</sup> Among the ethnic Saudi Arabian population, OA of the knee was reported to be between 1.19-3.5%,<sup>2,3</sup> but in a decade, half the prevalence of clinical OA of the knee jumped to 13%,<sup>4</sup> and radiological OA of the knee to 53% in males and 60.9% in females.<sup>5</sup> Traditionally, OA has been managed by pharmacological treatment, physical therapy, and nutritional supplements.<sup>6-11</sup> In 1934, arthroscopic lavage of the knee joint for OA was reported,<sup>12</sup> and arthroscopic joint debridement later came into vogue. There are conflicting reports of the benefits of arthroscopic debridement of the arthritic knee joint from no improvement to pain relief for years. In the last decade, the incidence of OA among the Saudi Arabian population has increased drastically,<sup>2,4</sup> but still our treatment modalities have not changed beyond NSAIDs, physical therapy, and high tibial osteotomy.<sup>13</sup> We believe that there is an urgent need to find a treatment for pain relief between conservative treatment and permanent surgery. Therefore, the objective of this study was to assess the benefits of arthroscopic joint debridement for primary OA of the knee joint.

**Methods.** Saudi Arabian patients aged  $\geq 39$  years and suffering with OA of the knee joint for 3 years, without pain relief on conservative treatment, were admitted between January 2001 and December 2006, to the King Fahd University Hospital, Al-Khobar, Kingdom of Saudi Arabia, for arthroscopic washout and debridement. Patients with secondary osteoarthritis, rheumatoid arthritis, and arthritis related to sickle cell disease were excluded. Preoperative assessment included weight and height of the patients to calculate body mass index (BMI), Lequesne grading (modified),<sup>14</sup> assessment of

plain standing weight bearing radiographs at 45° postero-anterior flexion, radiographs of the skyline view of the patella, and the radiographs were graded as per Kellgren and Lawrence grading.<sup>15</sup> The procedure was explained to the patients and informed consent was obtained. Arthroscopy of the knee joint was carried on either by epidural or general anesthesia under tourniquet control, and using antero-lateral and antero-medial portals using Karl Storz 30° scope, 7200B (Karl-Storz, Toltlingen, Germany). A diagnostic arthroscopy was carried out. Loose chondral flaps, hypertrophied synovium, and meniscal tears were shaved using Storz-Power shave SN MD 6B653 (Karl-Storz, Toltlingen, Germany). The joint was graded as per the Outerbridge classification.<sup>16</sup> Once the procedure was complete, the joint was irrigated using 3 liters of irrigation fluid. Patients were examined by the same examiner, and evaluated at 3, 6, 12, and 24 months. This study was approved by the Departmental Research Committee, and the Ethical and Research Committees of the College of Medicine, King Faisal University, Dammam and King Fahd University Hospital, Al-Khobar, Saudi Arabia.

All tests were performed using the Statistical Package for Social Sciences version 14.0 (SPSS Inc., Chicago, Illinois, USA) with statistical significance of *p*-value at <0.05, and a 95% confidence interval.

**Results.** One hundred and seven patients were analyzed. Fifty-five patients were males and 52 were females with a mean age of  $51 \pm 9.3$  (39-83). Forty-three patients had OA of one knee, and the rest had affection of both knees. The mean follow up was  $39.4 \pm 16.2$  months. Preoperative MLG was  $14.2 \pm 4.10$ , at 6 months it was 7.39, and at 12 months it was  $7.7 \pm 0.3$ , which improved from 6 months onwards (*p*=0.001) (Table 1). Younger patients had a lower MLG (*p*=0.05). The improvement in pain and the other assessed parameters significantly improved in the younger patients as compared with the older patients. The Kellgren and Lawrence grading

**Table 1** - Demographic data of 107 patients with parameters studied.

Age	N	Mean Age	KLG	OC	MLG Pre-washout	MLG 6 months	MLG 12 months	MLG 24 months
≤40	10	39.8 ± 0.5	2.1 ± 1.4 (0-4)	2.5 ± 0.9 (1-4)	11.3 ± 5.2 (1.5-18)	5.1 ± 4.1 (1-14.5)	4.8 ± 4.35 (0-14.5)	5.2 ± 4.2 (0-14.5)
41-50	46	45.1 ± 2.62	2.2 ± 1.3 (1-4)	2.5 ± 1.0 (0-4)	13.5 ± 3.8 (6-22)	6.5 ± 3. (2-14.5)	7 ± 3.8 (0.5-18)	6.9 ± 3.8 (0.5-21)
51-60	37	55.4 ± 2.59	2.7 ± 1.10 (1-4)	2.9 ± 0.99 (1-4)	15.1 ± 2.9 (10-22)	8.4 ± 3.2 (2-16)	8.8 ± 3.3 (0-16)	9 ± 3.3 (0-16)
>61	14	69.5 ± 2.16	3 ± 1.1 (1-4)	3.1 ± 1.1 (1-4)	16.1 ± 5.4 (8-24)	9.4 ± 4.1 (2-16)	9.6 ± 4.8 (2-16)	9.9 ± 4.8 (2-18)

Data are expressed as mean ± Standard Deviation (range). DKLK - Kellgren and Lawrence grading, MLG - Modified Lequesne grading, OC - Outerbridge classification

**Table 2** - Comparison between male and female patients.

Parameter	Males	Females	P-value
N	55	52	
Mean age	50.4 ± 8.1	51.6 ± 10.6	
BMI (m/kg <sup>2</sup> )	25 ± 2.6	32.1 ± 4.5	0.001
KLG	2.4 ± 1.3	2.1 ± 0.8	0.1
Outerbridge classification	2.5 ± 1	2.9 ± 0.9	0.05
MLG (pre-op)	12.4 ± 4	15.7 ± 3.7	0.001
MLG (12 months)	6.8 ± 4	8.6 ± 3.4	0.01
MLG (24 months)	6.5 ± 4.1	8.7 ± 3.8	0.004

Data are expressed as mean ± Standard Deviation (range).  
KLG - Kellgren and Lawrence grading, MLG - Modified Lequesne grading, BMI - body mass index

**Table 3** - Improvement on the basis of Kellgren and Lawrence grading.

KLG	N	MLG			
		Pre-operative	6 months	12 months	24 months
Grade 0	10	12.3 ± 2.6	3.7 ± 2.3	3.7 ± 2.3	4 ± 2.5
Grade I	18	12.2 ± 4.8	5.4 ± 2.6	5.5 ± 3.2	5.3 ± 3.1
Grade II	18	14.8 ± 3.4	8.7 ± 2.9	8.8 ± 3.2	8.8 ± 3.3
Grade III	30	14.1 ± 3.3	7.1 ± 3	7.6 ± 3.7	7.9 ± 3.9
Grade IV	31	16 ± 4.5	9.4 ± 3.9	10 ± 3.7	10.2 ± 3.9

Data are expressed as mean ± Standard Deviation (range). KLG - Kellgren and Lawrence grading, MLG - Modified Lequesne grading

and Outerbridge classification was significantly lower in younger as compared with older patients ( $p=0.05$ ). Table 2 shows the comparison between male and female patients. Although there was no significant difference between Kellgren and Lawrence grading, Outerbridge classification ( $p=0.05$ ), and preoperative MLG ( $p=0.001$ ) was significantly higher in females. Pain relief at 12 ( $p=0.01$ ) and 24 ( $p=0.004$ ) months were significantly better in males than females, and improvement of pain after arthroscopic debridement was significantly better in Kellgren and Lawrence grades 0-II versus grade III ( $p=0.01$ ) and IV ( $p=0.001$ ) (Table 3).

**Discussion.** The results of our study indicate that 71% of our patients had excellent to satisfactory results, and 12 (11.2%) had no improvement. The MLG improved from 6 months onwards, and Lawrence grading and Outerbridge classification were significantly lower in younger patients. The indications and benefits of arthroscopic joint debridement in OA of the knee have been on a roller coaster. Joint wash out was in practice since 1934 and was suggested to give pain relief. Moseley et al<sup>17</sup> estimated that 650,000 arthroscopic joint washouts are carried out yearly at a cost of \$3.5 billion in the United States, and still they found the procedure no better than a placebo. Siparsky et al<sup>18</sup> suggested that

there is some use for the procedure, however, there is no definitive indication for routine use. Contrary to these reports, after arthroscopic debridement there was significant amelioration in pain and improvement in function in 66%,<sup>19</sup> 68.5%,<sup>20</sup> and 87%<sup>21</sup> of the patients. In our study, we found that 71% of our patients had excellent and good results, and 12 (11.2%) had no improvement. Our study clearly suggests that arthroscopic joint debridement was beneficial.

Do all patients improve after arthroscopic debridement? The answer to this has not been simple to date. The inconsistencies of previous reports on the improvement could be well related to the degree of joint destruction, duration of the OA, BMI, and other factors. Initially, Dervin et al<sup>22</sup> found that patients with medial compartment OA had a better chance of improvement. Our results suggest otherwise, as most of our patients suffer from medial compartment OA, and all those who did not improve had the medial compartment affected, indicating there could well be other co-factors. Aaron et al<sup>23</sup> reported that 90% of their patients with mild OA improved. Our analysis showed that the improvement depended not on one, but multiple factors. Mounach et al<sup>24</sup> and Yoshimura et al<sup>25</sup> reported that weight was one of the significant factors in the severity of OA of the knee, which could effect the final outcome. Our female patients had a higher BMI and more severe disease than their male counterparts, and our results showed that in female patients the improvement was significantly lower, when compared to the male counterparts. The duration of pain relief after arthroscopic debridement is another issue, which is still being debated. Dervin et al<sup>22</sup> and Edelson et al<sup>26</sup> observed excellent to good results in 44-58.6% of their patients at 24 months, while Bernard et al<sup>27</sup> reported that 82% of their patients progressed to knee surgery at 5 years. In our group, after a mean follow up of 39 months, 71% had relief of their initial symptoms and were not contemplating any major reconstructive surgery. High tibial osteotomy has long been used as a modality of treatment in OAK for relief of the symptoms, and to correct varus deformity. Pfahler et al<sup>28</sup> reported excellent long-term results in over 90% of their patients, indicating that between conservative therapy and knee arthroplasty, high tibial osteotomy could postpone final arthroplasty.

There were a few study limitations. The retrospective nature of the study, and secondly we did not compare the study group with any control group. Moreover, the assessment of the patients was carried out by MLG, which better suited the cultural way of life of our patients than the Western way of life, for which the Lequesne index of severity for OA was described. Lastly, our patient population was small compared to the more common prevalence of OAK in the Saudi population.

In conclusion, the results of our study indicate that arthroscopic debridement helps in the amelioration of painful symptoms due to OA of the knee joint. Patients with higher BMI, older in age, and with severe OA did not fare well. Mechanical washout and removal of debris particularly calcified osteophytes helps in the amelioration of painful symptoms. We believe that arthroscopic washout has a role to play in the management of OA of the knees. As the Saudi Arabian population is ageing and the incidence of OAK is bound to increase, more randomized prospective studies, even though notoriously difficult are needed to advice the physicians of clear indications of arthroscopic joint lavage, and the outcome of clinical benefits.

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