

“Arthroscopic Joint Lavage and Debridement in Osteoarthritis Knee” - Our Experience

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Abstract:

Background: Osteoarthritis is the most common form of arthritis and a leading cause of chronic disability, to a great extent in knee and/or hip joints. The objective was to study the efficacy of arthroscopic lavage and debridement in providing a symptomatic and temporary relief to the symptoms of primary osteoarthritis of the knee.

Materials and Methods: Patients were selected from Orthopedic Out Patient Department, were subjected to the said procedure in OSMANIA GENERAL HOSPITAL from November-2013 to October -2015, on a sample size of 50 knees.

Results: In our study we have found that all the patients who had loose bodies, osteophytes or meniscal tears had excellent to good results after arthroscopic removal of these and lavage.

Conclusion: Arthroscopic Lavage and Debridement is an effective method of treatment for Osteoarthritis knee in selected patients. Patients with grade I and grade II KELLEGGREN osteoarthritis have good results and grade III osteoarthritis have fair results. Patients with symptoms of pain and locking due to loose bodies or degenerative meniscal tears benefit maximum from arthroscopic lavage and debridement.

Key words: Osteo-arthritis, Lavage, Debridement.

I. Introduction

Osteoarthritis is the most common form of arthritis and a leading cause of chronic disability, to a great extent in knee and/or hip joints. Arthritis deformans, as proposed by Heine¹ in 1926, was for many years considered a synonym for Osteoarthritis in the European medical community. The World Health Organisation estimates that Osteoarthritis is a cause of disability in at least 10% of the population over age 60 years² the most commonly involved joint is the knee joint. Burman et al³. reported on the use of arthroscopic lavage of the knee in 10 patients with osteoarthritis in the 1930s, reporting significant improvement in all patients. Bird and Ring⁴ 1978 Reported on 14 patients treated with Arthroscopic Lavage, 93% patients improved at 1 week and 59% had satisfactory improvement at 4 weeks. Gross⁵ 1991 reported in his study on 43 knees following arthroscopic debridement 72% good to excellent result. He stated that severity of the degenerative process was the best predictor of success

How Lavage Works

Various mechanisms have been explained for improvement in symptoms of osteoarthritis from arthroscopic lavage and debridement.

These are:

- 1) Removal of cartilage debris, proliferation of synovium, osteophytes, etc, interrupts the joint degeneration – the damage – the vicious circle of degeneration.
- 2) Removal of mediators of inflammation such as cytokines.
- 3) By adjusting the osmotic pressure of the synovial fluid and pH, and by adding electrolytes to improve the intra-articular environment, thus restoring the normal secretion of synovial fluid and improving the nutritional supply of cartilage.
- 4) Dilution of the degenerative compounds and disruption of adhesions.
- 5) Degenerated meniscus and loose bodies removal relieves the pain and locking.

II. Materials And Methods

Patients were selected from Orthopedic Out-patient Department were subjected to the said procedure in OSMANIA GENERAL HOSPITAL from November-2013 to October -2015, on a sample size of 50 knees .

Inclusion Criteria:

Men and women in the age group of 45 to 70 years with primary osteoarthritis knee , who were not relieved of their symptoms with conservative management .

Exclusion Criteria:

1. Patients with secondary osteoarthritis
2. Patients who refused to give informed consent.

A thorough history was taken and clinical examination was done.

Standard Anterior-posterior & Lateral plain radiographs of the knee were taken and grading was done by using The Kellgren and Lawrence system into 4 grades.

The Kellgren and Lawrence system



Grade I: Doubtful narrowing of the joint space, possible osteophytic lipping.

Grade II: Identified small osteophytes, definite narrowing of the joint space.

Grade III: Multiple, moderately sized osteophytes, definite joint space narrowing, some sclerotic areas and possible deformation of bone contour.

Grade IV: Multiple large osteophytes, severe joint space narrowing, marked sclerosis and definite deformity of bony contour.

We specifically define arthroscopic debridement as Joint lavage that includes dilution of the concentration of degradative enzymes as well as removal of small, free, mechanically irritating products of chondral, meniscal or synovial degeneration

- 1 Removal of discrete chondral or osteochondral loose bodies;
- 2 Partial meniscectomy; and/or Judicious chondroplasty.

After examining the joint, all degenerative tissues were removed. Loose body if any were also removed.

Menisci and Cruciate ligaments were examined. Torn and degenerated fragments were removed and menisci were balanced. Thorough lavage was given with Normal Saline, cartilage debris (wear particle, macromolecules) were seen in wash fluid. Skin incision was closed with 2-0 ethilon.

Sterile dressing and compression bandage was applied and tourniquet was deflated. Articular cartilage degeneration was graded according to the Outer bridge's arthroscopic classification-

The Outer bridge Classification

- Grade 0:** Normal.
- Grade I:** Softening and swelling of the articular cartilage.
- Grade II:** Partial thickness fissures.
- Grade III:** Full thickness fissures.
- Grade IV:** Bone exposed.

Post operative management

Intravenous antibiotics and anti inflammatory drugs were given as a routine. Quadriceps and hamstrings strengthening exercises given from 1st post operative days, sutures were removed on 10th post operative day.

Follow up: results evaluate using Knee Scoring System.

Rationale of the Knee Society clinical rating system⁶

Grading For Knee Society Score

- SCORE 80-100 EXCELLENT
- SCORE 70-79 GOOD
- SCORE 60-69 FAIR
- SCORE BELOW 60 POOR

Observations And Results

Table 1: Weight Distribution

OVER WEIGHT=BMI>25	NO.OF PATIENTS	PERCENT
NORMAL	31	62
OVER WEIGHT	19	38

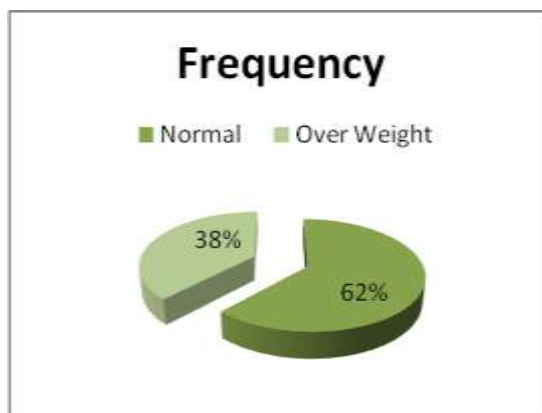


Table 2: Varus Angulation of the Knees

Angulation	Frequency	Percent
<10 (+)	10	20%
>10 (-)	40	80%

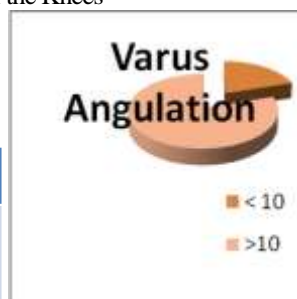


Table 3: Loose Body

Loose body

Loose bodies	Frequency	Present
Present +	20	40%
Absent -	30	60%

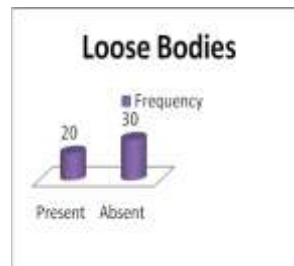


Table 4: Meniscal Tear

Meniscal	Frequency	Percent
Present +	10	20%
Absent -	40	80%

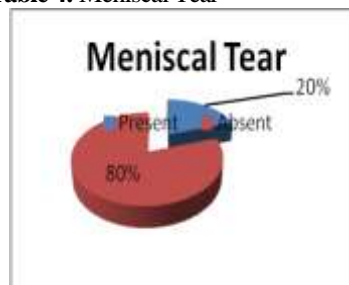


Table 5: Arthroscopic Grading

Grades	Frequency	Percent
I	4	8%
II	28	56%
III	12	24%
IV	6	12%

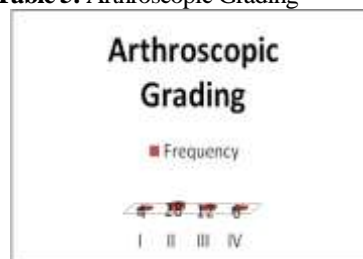
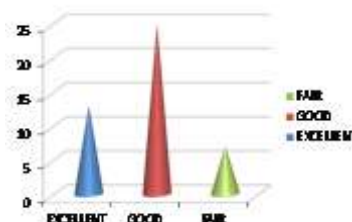


Table 6: Assessment at 1 Month Follow Up

ASSESSMENT AT 1 MONTH FOLLOW UP
TOTAL NO.OF PATIENTS=50

RESULTS	FREQUENCY	PERCENT
EXCELLENT	18	36
GOOD	25	50
FAIR	7	14

At 1 month follow up 86% patients had excellent to good results.



Graph 1: Follow up at 1 Month

Assessment at 3 months follow up
Total no . Of patients=50

Results	Frequency	Percent
Excellent	8	16
Good	26	52
Fair	12	24
Poor	4	8

Table 7: Assessment at 3 Months follow up

At 3 months follow up 68% patients had excellent to good results.

Graph 2: Follow up at 3 Months

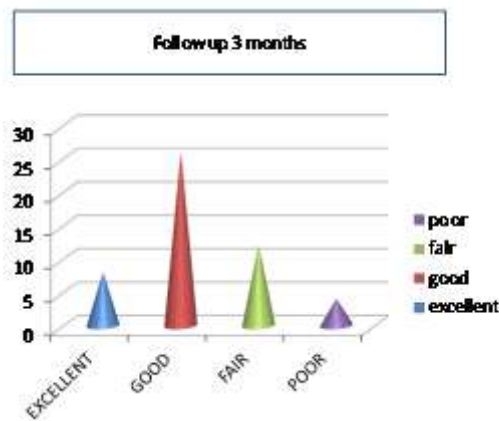


Table 8: Follow up 5 Months

Results	Frequency	Percent
Excellent	8	22.2%
Good	11	30.5%
Fair	10	27.7%
Poor	7	19.4%

Graph 3: Follow up at 5 Months

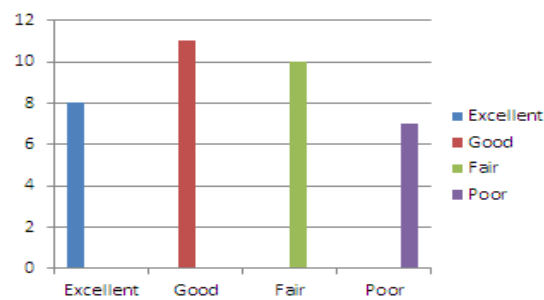


Table 9: Follow up 7 Months

Results	Frequency	Percent
Excellent	6	20%
Good	7	23.3%
Fair	14	46.6%
Poor	3	10%

Graph 4: Follow up at 7 Months

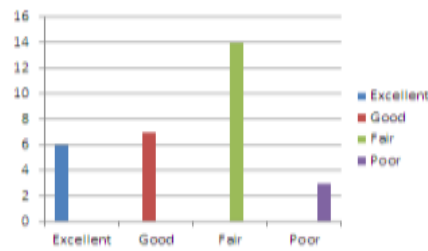


Table 10: Follow up 9 Months

Results	Frequency	Percent
Excellent	6	20%
Good	7	23.3%
Fair	12	40%
Poor	5	16.6%

Graph 5: Follow up at 9 Months

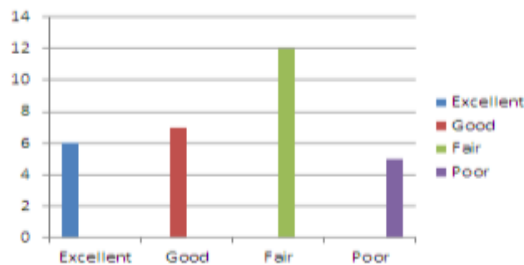
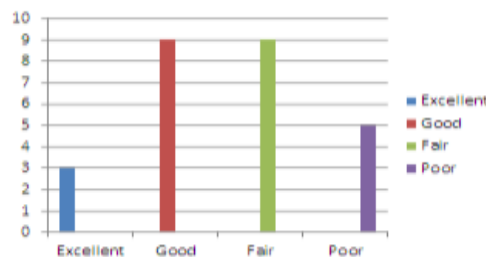


Table 11: Follow up 12 Months

Results	Frequency	Percent
Excellent	3	12.5%
Good	9	37.5%
Fair	9	37.5%
Poor	5	20.8%

Graph 6: Follow up at 12 Months



At 3 months follow up the results were evaluated based on the different variables

Variables –

Age of the patient ,Body mass index ,Varus deformity,Radiographic grading/
Arthroscopic grading

Inorder to determine the indications for arthroscopic lavage and debridement of the knee joint.

Table 12: Age Group Vs Results

Results	<50yrs(n=25)	>50yrs(n=25)	Total (n=50)
Excellent	6 24%	2 8%	8 16%
Good	12 48%	14 56%	26 52%
Fair	5 20%	7 28%	12 24%
Poor	2 8%	2 8%	4 8%

P value = 0.141 df = 7 $\chi^2 = 10.952$

Graph 7: Age Group Vs 3 Months result

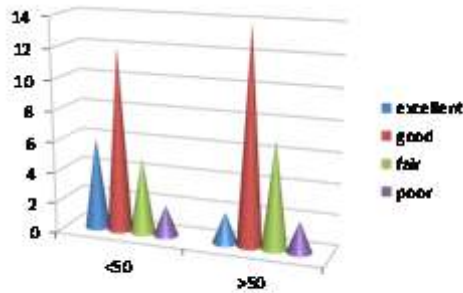


Table 13: Results Vs Radiological Grading

Results	Radiological Grade				Total (n=50)
	I (n=7)	II (n=27)	III (n=11)	IV (n=4)	
Excellent	5 71.4%	2 7.4%	1 9%	0 0%	8 16%
Good	2 28.5%	20 74%	3 27.2%	0 0%	25 50%
Fair	0 0%	5 18.5%	6 54.5%	2 50%	13 26%
Poor	0 0%	0 0%	1 9%	2 50%	3 6%

P value =<0.001 df = 21 $\pi^2 = 72.810$

Graph 8: Results Vs Radiological Grading

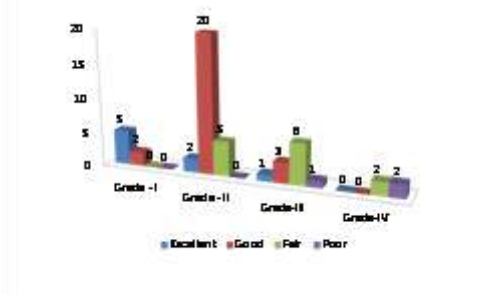


Table 14: Results Vs Arthroscopic Grading

Results	Arthroscopic grading				Total (n=50)
	I (n=4)	II (n=28)	III (n=12)	IV (n=6)	
Excellent	4 100%	4 14.2%	0 0%	0 0%	8 16%
Good	0 0%	20 71.4%	5 41.7%	0 0%	25 50%
Fair	0 0%	4 14.2%	6 50%	3 50%	13 26%
Poor	0 0%	0 0%	1 8.3%	3 50%	4 8%

P value =<0.001 df = 21 $\pi^2 = 63.308$

Graph 9: Results Vs Radiological Grading

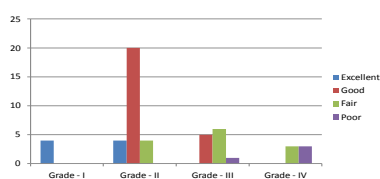


Table 15: BMI Vs Results

Results	BMI		Total (n=50)
	18.5-25 (n=28)	25-30 (n=22)	
Excellent	2 7.1%	6 27.3%	8 16%
Good	15 53.5%	10 45.5%	25 50%
Fair	9 32.1%	4 18.1%	13 26%
Poor	2 7.1%	2 9.1%	4 8%

P value = 0.470 df = 7 $\pi^2 = 6.613$

Graph 10: BMI Vs Results

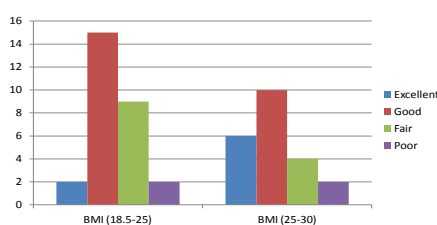
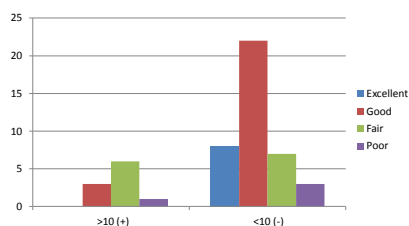


Table 16: Varus Angulation Vs Results

Result	Varus angulation		Total (n=50)
	>10(+) (n=10)	<10 (-) (n=40)	
Excellent	0 0%	8 20%	8 16%
Good	3 30%	22 55%	25 50%
Fair	6 60%	7 17.5%	13 26%
Poor	1 10%	3 7.5%	4 8%

P value = 0.022 df = 7 $\pi^2 = 16.369$

Graph 11: Varus Angulation Vs Results



III. Discussion

At the end of 3 months 86% of our patient were having significant improvement in their pain and function, 24% of the patients were having some pain relief whereas 8% patients were not having improvement. Those patients with poor outcome had severe osteoarthritis and had mal-aligned knee joint. We have evaluated our results with variables like Body Mass Index, Grade of osteoarthritis, Mal-alignment condition of the articular cartilage and Presence or Absence of mechanical irritants.

Body Mass Index: Gunter Spahn⁷ reported the outcome to be better in non obese and mild to moderate

osteoarthritis. Similarly in our study it was seen that patients with normal Body Mass Index have better functional outcome and they are pain free for longer time as compared to obese patient.

Mai-alignment: Salisbury⁸ and Jackson⁹ underlines the importance of minimal axial limb mal-alignment and biomechanical stable joints in achieving good results. In our study we have found out that patient with mal-alignment >10 degrees have poor outcome and their pain returns to pre-operative levels within 6 months.

Radiological grading: Gross et al were not able to show significant correlation between pre-operative radiological grading and the outcome but in our study we have found that there is significant correlation between these two and patient with grade I or II arthritis do well with the procedure. Patients with grade III arthritis had fair improvement.

According to John Richmond¹⁰ arthroscopic knee surgery is beneficial for mild to moderate osteoarthritis (Kellgren-Lawrence grade I and II).

In our study we have found that all the patients who had loose bodies, osteophytes or meniscal tears had excellent to good results after arthroscopic removal of these and lavage. The response is long lasting. This clearly shows that in addition to the primary pathology they had additional symptoms of pain, locking and instability due to these mechanical irritants and lavage in addition to the above mentioned benefits has an additional advantage of removal of these irritants.

Judicious debridement: Jackson reported that over-debridement leads to poorer functional outcome. We also suggest that the surgeon should be judicious in his debridement. The purpose of this surgical technique is not to restore the cartilage integrity or the lower limb alignment but to remove the intra-articular irritating factors with the purpose to alleviate the knee pain and to slow down the Osteoarthritis evolution.

Subjective element:- Moseley¹¹ et al attributed the success after the procedure to a washout or placebo effect.

The most important factor in determining success is proper patient selection, and many who have osteoarthritis of the knee will not benefit from arthroscopic debridement.

In our experience patients who have end-stage osteoarthritis or severe mal-alignment and those who do not have mechanical symptoms are unlikely to improve.

An objective analysis of outcome studies in patients who have osteoarthritis of the knee joint clearly shows that properly selected patients will benefit greatly from arthroscopic debridement and many will be saved from the increased morbidity and potential complications of alternative treatments.

Most of the published literature on arthroscopic lavage and debridement for osteoarthritis of the knee joint has comprised retrospective studies. The results vary among different observers and this modality of treatment is still controversial. Most of the authors report improvement in 50 to 80% individuals, however, as one would expect with the degenerative condition, results deteriorate with time but many were unable to identify pre-operative factors predicting long term results.

Indications for arthroscopic debridement of the Osteoarthritis knee do exist. This procedure may be even more important in young patients in whom it may buy some time for knee replacement. More so knowledge gained during arthroscopy may be helpful in deciding the future procedure such as high tibial osteotomy or knee replacement.

Decrease of the knee pain level is the most common short and medium term result obtained in selected patients by performing debridement arthroscopy for osteoarthritis.

Patients must be counselled that in addition to the routine risks of knee arthroscopic surgery and anaesthesia, the results of arthroscopic debridement of the Osteoarthritic knee are not entirely predictable, the goals are limited and that their prognosis includes a likely need for future and additional arthritis treatment including a possible need for future reconstructive surgery.

IV. Conclusion

1. Arthroscopic Lavage and Debridement is an effective method of treatment for Osteoarthritis knee in selected patients.
2. Patients with grade I and grade II osteoarthritis have good results and grade III osteoarthritis have fair results.
3. Patients with normal body mass index have good results.
4. Poor results are seen in knees with mal-alignment.
5. Patients with symptoms of pain and locking due to loose bodies or degenerative meniscal tears benefit maximum from arthroscopic lavage and debridement.

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