



ISSN (P): 2521-3466
ISSN (E): 2521-3474
© Clinical Orthopaedics
www.orthoresearchjournal.com
2018; 2(3): 100-105
Received: 17-05-2018
Accepted: 18-06-2018

Dr. Tarkik Amin
Assistant Professor, Department
of Orthopaedics NHL Medical
College, Ahmedabad, Gujarat,
India

Dr. Vipul Makwana
Assistant Professor, Department
of Orthopaedics NHL Medical
College, Ahmedabad, Gujarat,
India

Dr. Ajay Yadav
Senior Resident, Department of
Orthopaedics Banas Medical
College, Palanpur, Gujarat, India

Dr. Mansi Patel
Resident Doctor, Department of
Orthopaedics, NHL Medical
College, Ahmedabad, Gujarat,
India

Dr. Kaushal Sisodiya
Resident Doctor, Department of
Orthopaedics, NHL Medical
College, Ahmedabad, Gujarat,
India

Dr. Naitik Panchal
Resident Doctor, Department of
Orthopaedics, NHL Medical
College, Ahmedabad, Gujarat,
India

Correspondence
Dr. Vipul Makwana
Assistant Professor, Department
of Orthopaedics NHL Medical
College, Ahmedabad, Gujarat,
India

Results of arthroscopic surgery, with or without high Tibial osteotomy, in osteoarthritis of knee

Dr. Tarkik Amin, Dr. Vipul Makwana, Dr. Ajay Yadav, Dr. Mansi Patel, Dr. Kaushal Sisodiya and Dr. Naitik Panchal

Abstract

Introduction: Osteoarthritis is defined as a degenerative joint disease & it represents the failure of the diarthrodial joint. OA is the most common cause of chronic knee pain in persons over 45 years of age, and is the most common joint disorder. Management of Osteoarthritis of knee continue to pose a therapeutic challenge; because whatever be the treatment modality we cannot restore a normal knee and the damage done to the joint cartilage cannot be reverted by any means. Moreover, most of the patient comes for consultation, when substantial cartilage damage has already been done; & conservative treatment can no longer alleviate their symptoms. The purpose of surgical management is to reduce pain, increase function & improve overall symptoms, patient's satisfaction being the fundamental goal. There are so many surgical options for alleviation of symptoms in Osteoarthritis of knee; but in this study we are comparing the results between arthroscopic procedures alone and arthroscopic procedures along with high tibial osteotomy (HTO).

Aim: To compare the results between arthroscopic procedures alone and arthroscopic procedures along with high tibial osteotomy (HTO).

Materials and Methods: This was the study, first of its kind, where comparison had been done between arthroscopic procedure v/s arthroscopy + HTO. In this study, we compared the results between arthroscopy alone v/s arthroscopy plus high tibial osteotomy. So, in all patients we did arthroscopic procedure, & if correction of weight bearing axis was to be done then we did HTO along with arthroscopy. This is the study, first of its kind, where comparison has been done between arthroscopic procedure v/s arthroscopy + HTO. For comparing the results, we have JOA (Japanese Orthopaedic Association) Scoring system for clinical evaluation.

Results and Discussion: In our series, 93.4% of patients in arthroscopy group had good to fair result and none of the patient had very good to excellent result; but in arthroscopy and HTO group 40% of patients had very good and another 40% of patients had excellent result. From our series we can say that patients with medial compartment OA knee are benefited from arthroscopic procedures alone and arthroscopy with HTO. But, because of added benefit of correction of weight bearing axis in the second group, relief of symptoms is more and long lasting in arthroscopy & HTO group.

Conclusion: Arthroscopy plus high tibial osteotomy is a good alternative to unicompartment or total knee arthroplasty in patients with unicompartment OA knee; & in patients who want to preserve their natural joint. As, this is a small series and we have taken only 15 patients in each group; large series is required to confirm our results.

Keywords: Arthroscopic surgery, tibial osteotomy, osteoarthritis of knee

Introduction

Osteoarthritis is defined as a degenerative joint disease & it represents the failure of the diarthrodial joint^[1, 2]. OA is the most common cause of chronic knee pain in persons over 45 years of age, and is the most common joint disorder. Approximately 12% of population of age >65 years are affected by OA knee. It is a frequent, if not inevitable, part of ageing and is an important cause of physical disability in individuals over the age 65 years.

Management of Osteoarthritis of knee continue to pose a therapeutic challenge; because whatever be the treatment modality we cannot restore a normal knee and the damage done to the joint cartilage cannot be reverted by any means. Moreover, most of the patient comes for consultation, when substantial cartilage damage has already been done; & conservative treatment can no longer alleviate their symptoms. The purpose of surgical management is to reduce pain, increase function & improve overall symptoms, patient's satisfaction being the fundamental goal. First high tibial osteotomy for osteoarthritis knee was performed by Jackson

& Waugh in 1958 & they published a series of 10 cases in 1961.0) It was followed by a series by Wardee of Liverpool in 1962 [5, 6]. They osteotomised tibia distal to tibial tuberosity. Birchu first did diagnostic arthroscopy of knee in 1920 & is considered the inventor of arthroscopy of the knee [7, 8].

There are so many surgical options for alleviation of symptoms in Osteoarthritis of knee; but in this study we are comparing the results between arthroscopic procedures alone and arthroscopic procedures along with high tibial osteotomy (HTO). This is the study, first of its kind, where comparison has been done between arthroscopic procedure v/s arthroscopy + HTO. For comparing the results, we have JOA (Japanese Orthopaedic Association) Scoring system for clinical evaluation [9].

Aim

To compare the results between arthroscopic procedures alone and arthroscopic procedures along with high tibial osteotomy (HTO).

Materials and Methods

This was the study, first of its kind, where comparison had been done between arthroscopic procedure v/s arthroscopy + HTO. The patients were selected as per the mentioned inclusion and exclusion criteria:

Inclusion criteria

Patients with unicompartment OA knee, unicompartment OA knee with early patellofemoral arthritis, patients with tibia vara ranging from 5° to 18°, age - 45 -70 year, body mass Index - 20 -30, range of motion - near normal or at most 5° - 7° loss of extension, patient not wanting treatment in the form of joint replacement.

Exclusion Criteria

Patients with Tricompartment OA knee, arthritis other than gonarthrosis i.e. RA, psoriatic arthritis, crystal arthropathies, etc., Tibia vara >18°, Age >70 yrs, Body mass index > 30, Range of Motion (Flexion contracture >15° and Flexion < 90°), Acute exacerbation of inflammatory changes in the knee joint (we took the patient after the subsidence of the inflammatory changes, Patient having three or more co-morbidities like Ischemic heart disease, Diabetes Mellitus, Hypertension, Asthma, Thyroid pathology, Renal or hepatic diseases, Any other metabolic bone disorders, Patient operated for joint replacement of the hip or periarticular fractures of the knee, old malunited juxta articular fractures.

Our Preferred technique

In this study, we compared the results between arthroscopy alone v/s arthroscopy plus high tibial osteotomy. So, in all patients we did arthroscopic procedure, & if correction of weight bearing axis was to be done then we did HTO along with arthroscopy.

High Tibial Osteotomy

For high tibial osteotomy we had to first decide the correction

angle. For this we used both mechanical or anatomical femoro tibial angle and the weight bearing line. We used the Fujisawa method of angle³ correction in the present study. In our study, we used two techniques of Osteotomy: Lateral Closing Wedge Osteotomy and Medial Opening Wedge Osteotomy [3].

Post-Operative Management [3, 4]

Continuous passive motion was begun immediately after surgery, usually from 0 to 30 degree of flexion, progressing 10 degrees each day. Ambulation was started on the second day after surgery, 50% weight bearing with crutches was allowed for first 6 weeks followed by full weight bearing. Muscle strengthening and active range of motion exercises also were started on post-operative day 2. Long braces were worn while walking during first 6 weeks.

Assessment of Final Result

It was based on the total increased in points during the follow up, from the pre-operative score.

Result	Gain of Points
Excellent	>40 Points
Very Good	31-40 Points
Good	21-30 Points
Fair	11-20 Points
Poor	<10 Points

Observation and Analysis of Results

Age & Sex Incidence

Age Group	No. of Patients
45-50	05
51-60	11
61 - 70	14
Total	30

Sex Incidence

Sex	No. of Patients
Male	09
Female	21
Total	30

Oa Knee & Bmi

BMI	No. of Patients
20.0 - 21.9	00
22.0 - 23.9	04
24.0 - 25.9	07
26.0 - 27.9	13
28.0 - 29.9	06
Total	30

Comparison of Severity of Symptoms between Arthroscopy Group & Arthroscopy plus Hot Group According To Joa Score

1) Pain

Pain Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
No Pain at any time (30)	00	00	00	00
Mild Starting Pain (20)	00	00	00	00
Moderate Pain on walking (10)	10	66.7	02	13.3
Severe Pain on walking (05)	05	33.3	12	80
Severe Pain at rest (00)	00	00	01	6.7
Average Pain Score	8.39		5.3	
Total	15	100	15	100

2. Functions

Function Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
Walking unlimited (20)	00	00	00	00
Walking 0.5 - 1.0 km (15)	05	33.3	02	13.3
Walking <0.5 km (10)	10	66.7	10	66.7
Walking only indoors (05)	00	00	03	20
Cannot walk (00)	00	00	00	00
Average Function Score	13		9.7	
Total	15	100	15	100

3. Range of Motion

ROM Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
> 1200(20)	05	33.3	00	00
1190 _ 900 (15)	10	66.7	14	93.3
890 _ 600 (io)	00	00	01	6.7
59° - 30° (05)	00	00	00	00
<30°	00	00	00	00
Average ROM Score	16.7		14.7	
Total	15	100	15	100

4. Flexion Deformity

Flexion Deformity Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
00 - 100(10)	15	100	14	93.3
lio- 300 (05)	00	00	01	6.7
>30° (00)	00	00	00	00
Average Flexion Deformity Score	10		9.7	
Total	15	100	15	100

5. Varus / Valgus Deformity

Varus / Valgus Deformity Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
<50 (10)	11	73.3	00	00
60- 150(05)	04	26.7	15	100
>300 (00)	00	00	00	00
Average Varus / Valgus Deformity Score	8.7		05	
Total	15	100	15	100

6. Activities of Daily Living

Activities of Daily Living	Arthroscopy						Arthroscopy + HTO					
	Easy		Difficult		Impossible		Easy		Difficult		Impossible	
	No. of Patients	so 0s	No. of Patients	sP 0s	No. of Patients	so 0s	No. of Patients	vP 0s	No. of Patients	sP CT	No. of Patients	vP 0s
Rising from chair	15	100	00	00	00	00	04	26.7	11	73.3	00	00
Climbing stairs	04	26.7	11	73.3	00	00	00	00	14	93.3	01	6.7
Going downstairs	00	00	15	100	00	00	00	00	10	66.7	05	33.3
One foot standing	00	00	11	73.3	04	26.7	00	00	03	20	12	80
Running	00	00	02	13.3	13	86.7	00	00	00	00	15	100
Average Score	3.9						2.8					

Assessment of the Final Result of the Study

1. Duration of Follow Up

Period	Arthroscopy	Arthroscopy + HTO
6 Months - 12 Months	10	04
13 Months - 24 Months	02	04
> 24 Months	03	07
Total	15	15

2. Complications at Follow Up

Complication	Arthroscopy	Arthroscopy + HTO
Infection	00	01
Joint Stiffness	00	01
Lateral Popliteal Nerve Palsy	00	01

3. Pain at Follow Up

Pain Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
No Pain at any time (30)	00	00	02	13.3
Mild Starting Pain (20)	12	80	11	73.3
Moderate Pain on walking (10)	03	20	02	13.3
Severe Pain on walking (05)	00	00	00	00
Severe Pain at rest (00)	00	00	00	00
Average Pain Score	18		20	
Total	15	100	15	100

4. Function at Follow Up

Function Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
Walking unlimited (20)	03	20	01	6.7
Walking 0.5 - 1.0 km (15)	11	73.3	12	80
Walking <0.5 km (10)	01	6.7	02	13.3
Walking only indoors (05)	00	00	00	00
Cannot walk (00)	00	00	00	00
Average Function Score	15.7		14.7	
Total	15	100	15	100

5. Range Of Motion at Follow Up

ROM Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
> 120°(20)	05	33.3	03	20
1190. 1900(15)	10	66.7	12	80
89° _ 860 (io)	00	00	00	00
590 _ 300 (05) #	00	00	00	00
<30°	00	00	00	00
Average ROM Score	16.7		16	
Total	15	100	15	100

6. Range Of Motion at Follow Up

Flexion Deformity Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
00 - 10° (10)	15	100	14	93.3
lio- 300 (05)	00	00	01	6.7
>30° (00)	00	00	00	00
Average Flexion Deformity Score	10		9.7	
Total	15	100	15	100

7. Varus / Valgus Deformity At Follow Up

Varus / Valgus Deformity Score	Arthroscopy		Arthroscopy + HTO	
	No. of Patients	%	No. of Patients	%
<50 (10)	11	73.3	15	100
60- 150(05)	04	26.7	00	00
>30° (00)	00	00	00	00
Average Varus/Valgus Deformity Score	8.7		9.7	
Total	15	100	15	100

8. Activities of Daily Living At Follow Up

Activities of Daily Living	Arthroscopy						Arthroscopy + HTO					
	Easy		Difficult		Impossible		Easy		Difficult		Impossible	
	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%
Rising from chair	15	100	00	00	00	00	15	100	00	00	00	00
Climbing Stairs	14	93.3	01	6.7	00	00	12	80	03	20	00	00
Going down stairs	14	93.3	01	6.7	00	00	12	80	03	20	00	00
One foot standing	02	13.3	13	86.7	00	00	01	6.7	10	66.7	04	26.7
Running	00	00	03	20	12	80	00	00	02	13.3	13	86.7
Average Score	6.4						5.9					

9. Comparison of Average Increase in JOA Score in Preoperative and Follow up Period in Arthroscopy and Arthroscopy + HTO to Group

Average Score	Arthroscopy	Arthroscopy + HTO
Pre - operative JOA Score	58.9	47.2
Post - operative JOA Score	75.4	75.9
Total Gain of Score	16.5	28.7

Comparison of Results of Arthroscopy Versus Arthroscopy plus H to

Result	Arthroscopy		Arthroscopy + HTO	
Excellent	00	00	02	13.3
VERY GOOD	00	00	04	26.7
GOOD	04	26.7	06	40
FAIR	10	66.7	03	20
POOR	01	6.7	00	00
Total	15	100	15	100

Discussion

In our series, we have treated 30 Patients with osteoarthritis of knee; 15 Patients with arthroscopic debridement & 15 Patients with arthroscopic debridement plus high tibial osteotomy. Most of the Patients belonged to 6th & 7th decade with female predominance. OA Knee is more prevalent in obese person with higher BMI, as can be seen in our Study that 19 people had BMI of > 26.0. In our series, most of the patients in arthroscopy plus HTO group had severe pain (86.7%) than the patients in arthroscopy group (33.3%). In our series, patients in arthroscopy plus HTO group had more limitation in walking ability (86.7% in HTO group could walk <0.5 km compared to 66.7% in arthroscopy group). We can see that all patients in Arthroscopy plus HTO group had some loss of range of motion. One patient had flexion of 80°. In arthroscopy group five patients had full range of motion, compared to none in arthroscopy + HTO group. All patients in arthroscopy group had <10° of flexion deformity while one patients (6.7%) in arthroscopy + HTO group had 15° of flexion deformity. We can see that 100% of patients in arthroscopy + HTO group had varus / valgus deformity in the range of 6° - 15°, while only 26.7% of patients in arthroscopy had varus / valgus deformity of > 60.

In our study, we can see that 73.3% of Patients in arthroscopy + HTO group had difficulty in rising from chair compared to none in arthroscopy group. 93.3% of patients in arthroscopy + HTO group had difficulty in climbing stairs compared to none in arthroscopy group. For 33.3% of patients in arthroscopy + HTO group it was impossible to go down stairs compared to none in arthroscopy group. For 80% of patients in arthroscopy + HTO group it was impossible to stand on 1 foot compared to 26.7% of patients in arthroscopy group. For 100% of patients in arthroscopy + HTO group it was impossible to run compared to 86.7% of patients in arthroscopy group.

There was one case of infection in arthroscopy + HTO group which was cured by one week course of IV antibiotics. One patients in arthroscopy + HTO group developed stiffness of knee joint with decreased ROM and one patient developed lateral popliteal nerve palsy which recovered by its own in four months. By comparing with the pre-operative pain score we can see that in arthroscopy + HTO group 86.7% of patients had severe pain on walking or at rest and now 86.6% of patients had no pain to mild starting pain. Mean while in the arthroscopy group only 33.3% of patients had severe pain on walking or at rest and post operatively 80% had mild starting pain. No patients had complete relief of pain at any time. Also, the average pain score in the arthroscopy group pre and post operatively were 8.3 and 18, respectively; while in arthroscopy + HTO group were 5.3 and 20 respectively. So, relief of pain was much more in arthroscopy + HTO group.

By comparing with the pre operative walking score we see that in arthroscopy group walking ability up to 1 km increased from 33.3% to 93.3% (60% increase) while in arthroscopy + HTO group it increased from 13.3% to 86.7% (73.4% increase). Also, the average walking score in the arthroscopy group pre and postoperatively were 13 and 15.7, respectively; while in arthroscopy + HTO group were 9.7 and 14.7 respectively. So, walking ability on an average increased much more in arthroscopy + HTO group (2.7 compared to 5 points). By comparing with the preoperative scores, we see that there was no change in score in the arthroscopy group while, in the arthroscopy + HTO group 20% of patients got a range of motion of >1200. Also, average pre and post operative score for range of motion in arthroscopy group was 16.7 while it increased from 14.7 to 16 in arthroscopy + HTO group.

We see that in both the groups there was no change in flexion deformity and average score remained the same in pre and

postoperative period. there was no change in varus/ valgus deformity in pre and postoperative period in arthroscopy group; while all patients had maintained the correction of angle, in arthroscopy plus HTO group.

By comparing with the preoperative score we can see that there was significant improvement in activities of daily living in both the groups during follow up. The average score in arthroscopy group improved from 3.9 to 6.4 (gain of 2.5 Points) & in arthroscopy + HTO group from 2.8 to 5.9 (gain of 3.1 Points). So, gain of points was again more in arthroscopy + HTO group. During follow up average gain of score in arthroscopy group was 16.5 & in arthroscopy + HTO group was 28.7 (almost double of arthroscopy group)

In our series, we see that in arthroscopy group 93.4% of patients had good to fair result while 6.7% of patients had poor result; while in arthroscopy + HTO group 40% of patients had excellent to very good result and another 40% of patients had good results.

After analyzing the results of both Arthroscopy & Arthroscopy Plus High Tibial Osteotomy as a treatment for osteoarthritis of the knee, following conclusions can be drawn: Patients who have lower JOA scores are benefited more by arthroscopy & HTO, than arthroscopy alone. As the weight bearing line is brought to normal, in arthroscopy & HTO, patients are pain free for longer duration compared to doing arthroscopy alone. Average walking distance also increases more in arthroscopy and HTO group than arthroscopy alone. In our series, 93.4% of patients in arthroscopy group had good to fair result and none of the patient had very good to excellent result; but in arthroscopy and HTO group 40% of patients had very good and another 40% of patients had excellent result.

Conclusion

From our series we can say that patients with medial compartment OA knee are benefited from arthroscopic procedures alone and arthroscopy with HTO. But, because of added benefit of correction of weight bearing axis in the second group, relief of symptoms is more and long lasting in arthroscopy & HTO group.

Arthroscopy plus high tibial osteotomy is a good alternative to unicompartment or total knee arthroplasty in patients with unicompartment OA knee; & in patients who want to preserve their natural joint.

As, this is a small series, and we have taken only 15 patients in each group; large series is required to confirm our results

References

1. Harrison's Principles of Internal Medicine 02 / 17th Edition.
2. Osteoarthritis: e-medicine Rheumatology, emedicine, 2009. medscape.com/article/3304
3. Elsevier's Operative Techniques in Orthopaedics, 2007, 17 (1).
4. Campbell's Operative Orthopaedics Edition, 1.
5. Coventry MB, Histrup DM, Wallrichs SL. Proximal tibial osteotomy; a critical long term study of eighty seven cases. *Jbjs-am*, 1993, 75.
6. Hernigou P, Medeville D, Debeyne J. Proximal Tibial Osteotomy for osteoarthritis with varus deformity: a ten to thirteen year of follow up study. *JBJS*, 1987, 69.
7. *Arch - Orthopaedic Trauma Surgery*. 1996; 115:290-294.
8. Kieser CW, Jackson RW, Severin Nordentoft. The first arthroscopist. *Arthroscopy*. 2001; 17(5):532-5.
9. Azimi P, Shahzadi S, Benzel EC, Montazari A. Functional evaluation using the modified Japanese Orthopedic

Association score (m JOA) for cervical spondylotic myelopathy disease by age, gender, and type of disease. *Journal of Injury and Violence Research*. 2012; 4(31):42.