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Functional outcome of high tibial osteotomy among patients with osteoarthritis

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Abstract
Introduction: Osteoarthritis of knee is more common among all types of arthritic conditions. High tibial osteotomy is an accepted surgical technique for treatment of medial compartment arthrosis of knee in younger patients. Selection of the appropriate patients, extensive pre-operative planning and accurate surgical technique are essential for successful outcome. The methods of high tibial osteotomy include open wedge osteotomy and closed wedge osteotomy, the later procedure being more popular.
Aims and Objectives: To assess the functional outcome among patients undergoing high tibial osteotomy.
Methodology: A hospital based prospective interventional study was done on 30 patients of osteoarthritis with varus deformity. For all the 30 patients after a proper preoperative assessment the surgical intervention in the form of high tibial osteotomy was done and the outcome was evaluated using knee society scoring system.
Results: Among the study population 73.3% of the patients had grade III type of osteoarthritis and only 26.6% had grade IV type of osteoarthritis based on Kellgren and Lawrence type of classification. The mean knee score and the mean functional score of the patients before surgery were 54.6 and 53.9 respectively and post operatively at the end of 12 months the knee score and functional score was 83.1 and 82 respectively. A statistically significant improvement was seen in both the knee society score and the functional score.
Conclusion: The main improvements seen in this study was the increase in the knee score and functional score after high tibial osteotomy for the patients of osteoarthritis with varus deformity. Appropriate patient selection, proper osteotomy types and precise surgical techniques are essential for the success of high tibial osteotomy.

Keywords: Osteoarthritis, high tibial osteotomy, knee score

1. Introduction
A recent World Health Organization report on the worldwide burden of disease indicates that knee Osteoarthritis alone is likely to become the 4th most important cause of disability in women and the 8th in men [1]. Knee osteoarthritis is much more prevalent in India than in west and accounts as much more disability as any of other chronic conditions. Osteoarthritis once considered being a disease of elderly but in the recent years it is becoming more common even in people aged less than 50 years [2]. Both systemic factors (e.g. age, sex, genes) and local factors (e.g. muscle weakness, joint deformity) appear to influence the risk of individual joints developing the disease. The specific aetiological factors are unknown, but may include mechanical overloading, failure of the chondrocyte-controlled internal remodelling system and extra cartilaginous factors such as synovial or vascular changes [3].
High tibial osteotomy is an accepted surgical technique for treatment of medial compartment arthrosis of knee in younger patients [4]. The biomechanical principle of high tibial osteotomy is to redistribute the weight bearing forces from the worn medial compartment across to the lateral compartment thereby relieving pain and slowing the disease progression. Selection of the appropriate patients, extensive pre-operative planning and accurate surgical technique are essential for successful outcome [5]. The methods of high tibial osteotomy include medial open wedge osteotomy and lateral closed wedge osteotomy, the later procedure being more popular.

This procedure stands ahead of closed wedge osteotomy because the Peroneal nerve is not in jeopardy and there is no disruption of proximal tibiofibular joint and lateral collateral ligaments worth achievement of more precise correction [6].

Functional outcomes are usually evaluated with respect to treatment goals and goal achievement. It is just not enough to report whether improvement had achieved or not. The most important factor was to evaluate whether the individual treatment goal or rehabilitation goal has been reached. The treatment goal must be individualized, and it must be appropriate and meaningful in terms of activities that are important for the patient with respect to age, sex, and their activity level [7-9].

2. Aim

To assess the functional outcome of high tibial osteotomy among the patients with unicompartmental osteoarthritis of knee with varus deformity.

3. Methodology

A hospital based prospective interventional study was conducted in our hospital for a period of one year between August 2014 to July 2015 and in that 30 patients with unicompartment osteoarthritis with varus deformity were included for the study. The patients selection was done based on both clinical and radiological assessment. There are various high tibial osteotomy techniques including closing wedge osteotomy, opening wedge osteotomy, dome osteotomy, progressive callus distraction, and chevron osteotomy. Of all these we mainly performed opening wedge high tibial osteotomy and closing wedge high tibial osteotomy as being considered as the most common methods. Assessment and evaluation was done using a regularized custom made protocol which included the symptoms of the patients, associated medical conditions, knee society score and knee society functional score.

The Knee Society Score [10] is a special score which has been widely accepted as an objective measure of knee status in patients undergoing high tibial Osteotomy. It is a hundred points scoring system and based on the scores the results of the patients were classified as follows

Score between

100 – 85 points are considered excellent

84 – 70 points are considered good

69 – 60 points are considered poor results

< 60 points are considered poor results

Post-operative X ray were taken in the immediate postoperative and later on after 1 month, 6 months and yearly thereafter.

All the data were entered and analyzed by using a statistical software SPSS version 20.

4. Results

Table 1 shows the age wise distribution of the study population. It is seen from the table that the age of the patients had ranged from 45 – 50 years with a mean age of 48.2 years. The majority of the patients were between 49 – 50 years. Among the 30 patients 20 were females and 10 were males and 27 of the patients had only unilateral osteoarthritis and only 3 patients had bilateral osteoarthritis. The mean knee score of the patients before surgery was 54.6 and the mean functional score was 53.9 and both these mean scores were considered as poor based on the categorization of the scores (table 2) and based on the grading of osteoarthritis by Kellgren and Lawrence 22 patients were graded as grade III osteoarthritis and 8 patients had grade IV osteoarthritis. Post-operatively all the patients were followed for a period of 1 year at the interval of 3, 6 and 12 months. In each visit the patient's knee score was assessed using the standard orthopaedics knee society protocol. The before and after surgery comparison scores had shown a statistically significant improvement (table 3). Patients total knee score had gradually improved over the period of 1 year. The score which was initially in the range of fair to good at the end of 1 year it had shown excellent (>80). The improvement in the score over the period of 1 year was proven to be statistically significant (p<.0001) and similar type of results was also observed in the functional score (table 4). The post-operative complications which were reported in the study were found to be very minimal only 3 cases reported with immediate post-operative infections for which it was treated appropriately and one case had developed foot drop (table 5).

5. Discussions

Pain is normally the main indication for high tibial osteotomy and it was the only variable where most gain was expected and obtained. In our study almost 90% of the patients had achieved the pain relief. A study done by Sprenger and Doerzbacher [11] where they treated 76 knees with closing wedge high tibial osteotomy and internal fixation, had shown the survival rates were 65–74% at the end of ten years after surgery and further they had also quoted that ten-year survivorship was 90%, when the femorotibial angle was between 8 and 16° valgus at the end of one year after surgery. Another study done by Tang and Henderso [12] where they treated 67 knees with lateral closing high tibial osteotomy, fixed with staples or plate or immobilized in a long leg cast and showed the survival rates were 89.5% at five years, 74.7% at ten years and 66.9% for 15 and 20 years.

Chiang *et al* [13] had used a dome-shaped high tibial osteotomy and external fixation to treat 25 knees with medial compartment arthrosis. In that series the knee society score was excellent or good in 18 knees at the end of five years and in 13 knees it was average to good at the end of 15 years. Gstöttner *et al*. [14] treated 134 arthritic knees with lateral closing High Tibial Osteotomy, fixed with staples. The survival rates were 94% at five years, 79.9% at ten years, 65.5% at 15 years and 54.1% at 18 years. A similar study done on a larger population by Akizuki *et al* [15] on 118 with unicompartmental osteoarthritis where he performed closed wedge high tibial osteotomy fixed with a plate for all the patients and followed them for a period of fifteen years and found that 97.6% of the patients had excellent to good score at the end of 10 years and 90.4% of patients had the similar type of score at the end of fifteen years.

A medial compartment osteoarthritis in a young patient with good arc of motion is expected to give a satisfactory motion, better function with less pain in 80% of the time after five years. This would, however, deteriorate with time [16]. Arthroplasty, however, despite excellent pain relief and improved function, would not be a life-long remedy for a young person as it has certain limitations like being more expensive and also imposes some functional limitations which are not always acceptable in developing countries [17]. The difficulty in revising a unicompartmental to a total arthroplasty has been a concern. The degree of valgus alignment obtained at surgery and, more so, the remaining valgus alignment with passage of time has been reported as positive factors affecting the results [18]. Almost 90% of our patients had maintained their valgus alignment.

6. Conclusions

The present study had proven that high tibial osteotomy for patients with unicompartmental osteoarthritis were able to produce reduction in pain and had also increased the knee score and functional score. Appropriate patient selection, proper osteotomy types, and precise surgical techniques are essential for the success of high tibial osteotomy. In addition, the literatures had proven that successful outcome of high tibial osteotomy can be maintained for more than 8 to 10 years thereby delaying the need for conversion to total knee arthroplasty. Therefore, high tibial osteotomy should be recommended for the treatment of degenerative arthritis of the knee among young patients.

7. References

1. Arya RK, Jain Vijay. Osteoarthritis of the knee joint: An overview. JIACM. 2013; 14(2):154-62.
2. Catherine Hui, Lucy J Salmon, Alison Kok, Heidi A Williams, NielsHockers, Willem M. van der Tempel, Rishi Chana, Leo A. Pinczewski. Long-Term Survival of High Tibial Osteotomy for Medial Compartment Osteoarthritis of the Knee. The American Journal of Sports Medicine. 2011; 39(1):64-70.
3. Su Chan Lee, Kwang Am Jung, Chang Hyun Nam, Soong Hyun Jung, Seung Hyun Hwang. The Short-term Follow-up Results of Open Wedge High Tibial Osteotomy with Using an Aescula Open Wedge Plate and an Allogenic Bone Graft: The Minimum 1-Year Follow-up Results. Clinics in Orthopedic Surgery. 2010; 2:47-54.
4. Chang-Wug Oh, Sung-Jung Kim, Sung-Ki Park, Hee-June Kim, Hee-Soo Kyung, Hwan-Sung Cho *et al*. Hemicallotasis for correction of varus deformity of the proximal tibia using a unilateral external fixator. J OrthopSci. 2011; 16:44-50.
5. Keene JS, DyrebyJr JR. High tibial osteotomy in the treatment of osteoarthritis of the knee. The role of preoperative arthroscopy. J Bone Joint Surg Am. 1983; 65:36-42.
6. Keene JS, Monson DK, Roberts JM, DyrebyJr JR. Evaluation of patients for high tibial osteotomy. Clin Orthop. 1989, 157-65.
7. Porn I. An equilibrium model of health. In: Nordenfelt L, Lindahl BIB, editors. Health, disease, and causal explanations in medicine. Dordrecht: Reidel. 1984, 3-9.
8. Feinstein AR, Josephy BR, Wells CK. Scientific and clinical problems in indexes of functional disability. Ann Intern Med. 1986; 105:413-20.
9. Nordenfelt L. On the nature of health. Chapter 3: Towards a holistic theory of health. Dordrecht: Reidel. 1987, 35-104.
10. Naudie D, Boume RB, Rorabeck CH, Bourne TJ. The install award. Survivorship of the high tibial valgus osteotomy. A 10 - 22 year follows up study. Clin Orthop Relat Res. 1999.
11. Sprenger TR, Doerzbacher JF. Tibial osteotomy for the treatment of varus gonarthrosis. Survival and failure analysis to twenty-two years. J Bone Joint Surg Am. 2003; 85-A:469-474.
12. Tang WC, Henderson IJP. High tibial osteotomy: long term survival analysis and patients' perspective. Knee. 2005; 12:410-413. doi: 10.1016/j.knee.2005.03.006.
13. Chiang H, Hsu H, Jiang C. Dome-shaped high tibial osteotomy: a long-term follow-up study. J Formos Med Assoc. 2006; 105(3):214-219. doi: 10.1016/S0929-6646(09)60308-9.
14. Gstöttner M, Pedross F, Liebensteiner M, Bach C. Long-term outcome after high tibial osteotomy. Arch Orthop Trauma Surg. 2008; 128(1):111-115.
15. Akizuki S, Shibakawa A, Takizawa T, Yamazaki I, Horiuchi H. The long-term outcome of high tibial osteotomy: a ten- to 20-year follow-up. J Bone Joint Surg Br. 2008; 90(5):592-596. doi: 10.1302/0301-620X.90B5.20386.
16. Meding JB, Kearing EM, Ritter MA *et al*. Total knee arthroplasty after high tibial osteotomy. Clinorthop. 2000; (375):175-84
17. Wright RJ, Sledge CB, Poss R *et al*. Patient-reported outcome and survivorship after Kinemax total knee arthroplasty. J Bone Joint Surg Am. 2004; 86-A:2464-70.
18. Patond KR, Lokhande AV. Medial open wedge high tibial osteotomy in medial compartment osteoarthrosis of the knee. Natl Med J India. 1993; 6:104-8.