



## Research Report

# Clinical evaluation of post high tibial osteotomy patients in Dr. Soetomo General Hospital Surabaya, Husada Utama Hospital Surabaya, Al-Irsyad Hospital Surabaya in 2010 - 2015

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## ABSTRACT

Osteoarthritis (OA) of the knee is a disruption in the knee joint which is characterized by pathological changes in the structure in the knee joint that occur progressively. High Tibial Osteotomy (HTO) is a therapeutic option for treating isolated medial compartment OA in varus genu and one of the routine surgical procedures performed in the orthopedic field. As the number of OA cases increases, the number of high tibial osteotomy (HTO) procedures also increases, so clinical evaluation is needed to see whether HTO can meet patient expectations. This study was a retrospective descriptive study with a sample of patients who had undergone the 2010 to 2015 open wedge high tibial osteotomy (OWHTO) procedure. The evaluation used the Knee Society Score, Knee Injury and Osteoarthritis Outcome Score, and Modified Hospital instruments for Special Surgery Knee Scoring. The data obtained are then grouped and analyzed to calculate the average of each instrument. The results showed a sample of 6 knees consisting of 2 male samples (33.3%) and 4 female samples (66.7%). All samples are over 35 years old. The evaluation results using KOOS scores obtained the mean value of the pain component was 77.7; complaint component = 70.3; daily activity component = 76.2; sports and recreation components = 47.9; and components of quality of life = 74.1. On the SSC score, the average knee score was 70.8 and the average functional score was 61.6. Whereas the HSS score obtained by the average functional score is 81.5. This study produced each score with a good average value. This shows that the choice of the High Tibial Osteotomy operating technique provides satisfactory operating results. So that the High Tibial Osteotomy surgery technique can be an option in the case of Osteoarthritis. With the many choices of types of surgery in patients with Osteoarthritis, the High Tibial Osteotomy can be a good choice for patient satisfaction.



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### ABSTRAK

Osteoarthritis (OA) lutut adalah gangguan pada sendi lutut yang ditandai oleh perubahan patologis pada struktur di dalam sendi lutut yang terjadi secara progresif. High Tibial Osteotomy (HTO) merupakan pilihan terapi untuk penanganan isolated medial compartment OA pada genu varus dan salah satu prosedur operasi yang rutin dilakukan di bidang orthopedi. Dengan meningkatnya jumlah kasus OA meningkat pula jumlah prosedur high tibial osteotomy (HTO), sehingga perlu dilakukan evaluasi klinis untuk melihat apakah HTO dapat memenuhi harapan pasien. Penelitian ini merupakan penelitian deskriptif retrospektif dengan sampel pasien yang telah menjalani prosedur open wedge high tibial osteotomy (OWHTO) 2010 sampai 2015. Evaluasi menggunakan instrument Knee Society Score, Knee Injury and Osteoarthritis Outcome Score, dan Modified Hospital for Special Surgery Knee Scoring. Data yang didapat selanjutnya dikelompokkan dan dianalisa utk menghitung rata-rata dari masing-masing instrumen. Hasil penelitian didapatkan sampel sejumlah 6 lutut yang terdiri dari 2 sampel laki-laki (33,3%) dan 4 sampel perempuan (66,7%). Semua sampel berusia di atas 35 tahun. Hasil evaluasi menggunakan skor KOOS didapatkan nilai rerata komponen nyeri adalah 77,7; komponen keluhan = 70,3; komponen aktivitas harian = 76,2; komponen olahraga dan rekreasi = 47,9; dan komponen kualitas hidup = 74,1. Pada skor KSS didapatkan rerata knee score adalah 70,8 dan rerata functional score adalah 61,6. Sedangkan pada skor HSS didapatkan rerata functional score adalah 81,5. Penelitian ini menghasilkan masing-masing skor dengan nilai rata-rata yang bagus. Hal ini menunjukkan bahwa pilihan teknik operasi High Tibial Osteotomy memberikan hasil operasi yang memuaskan. Sehingga teknik operasi High Tibial Osteotomy dapat menjadi salah satu pilihan pada kasus Osteoarthritis. Dengan banyaknya pilihan macam operasi pada penderita Osteoarthritis maka High Tibial Osteotomy dapat menjadi satu pilihan yang baik untuk kepuasan pasien.

**Kata kunci:** Osteoarthritis, High Tibial Osteotomy, Knee Society Score, Knee Injury and Osteoarthritis Outcome Score, Modified Hospital for Special Surgery Knee Scoring

### INTRODUCTION

Osteoarthritis (OA) of the knee is a disruption in the knee joint which is characterized by pathological changes in the structure in the knee joint that occur progressively. Pathological changes include softening and degradation of the cartilage accompanied by the formation of new cartilages and bones (osteophytes), the formation of cysts and sclerosis in the subchondral bone, synovitis and capsular fibrosis (Bonasia, 2014).

The World Health Organization (WHO) estimates that 37.4% of the world's population over the age of 70 suffer from knee OA and 12.1% of them are symptomatic knee OA. Symptomatic knee OA is defined as OA with 2 or more degrees based on the Kellgren-

Lawrence classification. 1 The prevalence of OA varies depending on the definition of OA and the characteristics of the study population. Data from the Framingham Study shows the prevalence of radiological OA at the age of 45 years is 19.2%. Surveys from the National Health and Nutrition Examination Survey (NHANES III) show that 37% of participants over the age of 60 suffer from OA (Ihle, 2016).

Diagnosis of knee OA is obtained through history, clinical manifestations, laboratories, and radiological examination. From history, the most complaints in knee OA is a pain. Pain that arises is usually burdensome when the knee is used to stand or walk. Usually, the patient will walk limping because of the pain felt by the patient. In palpation, tenderness can



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be found on the knee. In addition, knee OA is also found to decrease the range of motion of flexion and extension movements. Laboratory examinations are not routinely carried out in making a diagnosis of OA but can play a role in getting rid of differential diagnosis or seeking causes for secondary knee OA. Radiological findings often found in knee OA include joint gap narrowing, osteophytes, subchondral sclerosis, cyst formation, and deformity. Narrowing of the joint gap is the main sign because it indicates thinning of the cartilage even though there is no normal thick reference of cartilage thickness on x-ray photos (Lansdaal, 2016).

High tibial osteotomy (HTO) was originally introduced by Dr. Langenbeck in 1854. The surgical technique was an efficient method for handling unicondiler osteoarthritis. HTO aims to move the mechanical axis from medial to lateral from the middle of the knee to reduce the load and slow the occurrence of OA. HTO is a therapeutic choice for treating isolated medial compartment OA in the varus genus, reported by Jackson in 1958 (Madri, 2016; Sabzevari, 2016; Kolb, 2010).

An outcome assessment or a scoring outcome is important to evaluate accurately and the objective procedure of the HTO Opening wedge carried out. There are many types of scoring methods available to assess the results of HTO Opening Wedges, some of which are Knee Injury and Osteoarthritis Outcome Score (KOOS), Knee Society Score (KSS), and Modified Hospital for Special Surgery Knee Scoring (HSS Knee Score). KOOS is one of the most commonly used assessments to evaluate therapy in knee OA. There are five domains on KOOS, namely: (1) pain, (2) complaints of swelling, grinding, clicking, and restriction of motion, (3) ability to carry out daily activities, (4) ability to do sports and recreational activities, and (5) quality of life of patients related to patient complaints. SSC was introduced in 1989, this

questionnaire is observer-administered which contains two components, namely the first is the clinical assessment of the knee and the second is functional assessment seen from the overall patient performance. While HSS was first introduced by Dr. Insall in 1993, this score included an objective assessment based on clinical and functional parameters (Sik, 2016; Ihle, 2016).

### METHODS

The researcher conducted a retrospective descriptive study in patients who had undergone an open wedge high tibial osteotomy (OWHTO) procedure. The sample in this study was a total sampling of all surgery on the right knee, or left or both who underwent OWHTO surgery from 2010 to 2015. Patients included in the inclusion criteria in this study included patients who had undergone HTO surgery either one side or two sides more than one year post-operative, Using the open wedge osteotomy method, the patient is still alive, cooperative and willing to be examined. Patients who are included in the exclusion criteria are patients with severe comorbidities and cognitive impairments that do not allow for examinations and interviews.

Patients who met the inclusion criteria were visited or invited to undergo an examination conducted at the orthopedic polyclinic of RSUD Dr. Soetomo Hospital from January to February 2017. Patients were examined and interviewed using a scored questionnaire from the Knee Society Score (KSS), Knee Injury and Osteoarthritis Outcome Score (KOOS), and Modified Hospital for Special Surgery Knee Scoring (HSS Knee Score).

### RESULTS

During 2010 until 2015 there were 18 high tibial osteotomy operations at Dr. Soetomo Hospital Surabaya, Al - Irsyad Hospital Surabaya, and Surabaya Husada Utama Hospital. Of the 6



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surgeries (knees that had undergone surgery) that were obtained, female patients were more than male patients which were 66.7% compared to 33.3% (Figure 1).

From the data collected, all samples are over 35 years old. The age groups 55-64 years and 65-74 years each consisted of two samples. Other age groups consist of one sample (Figure 2).

In this study the KOOS score assessment of all samples was calculated averaged and it was

found: the mean value of the pain component was 77.7; the average value of the complaint component is 70.3; the average component of daily activity is 76.2; the average value of the sport and recreation component is 47.9, and the mean value of the quality of life is 74.1 (Figure 3). The average Knee Society Score resulted in a knee score = 70.8 and an average functional score = 61.6. (Figure 4). The mean HSS score obtained by the average functional score was 81.5 (Figure 5).

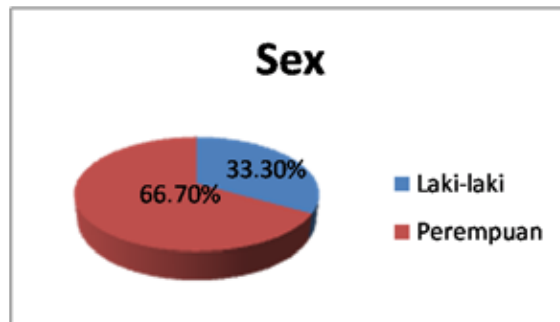


Figure 1. Distribution of samples by sex

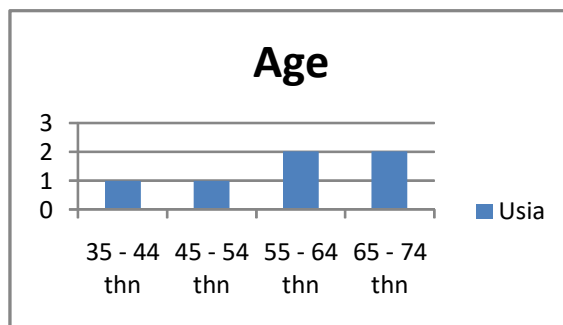


Figure 2. Distribution of samples based on age

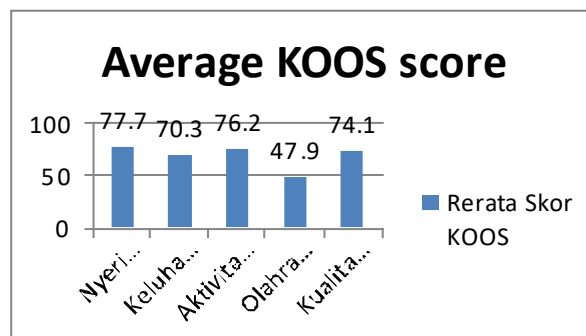
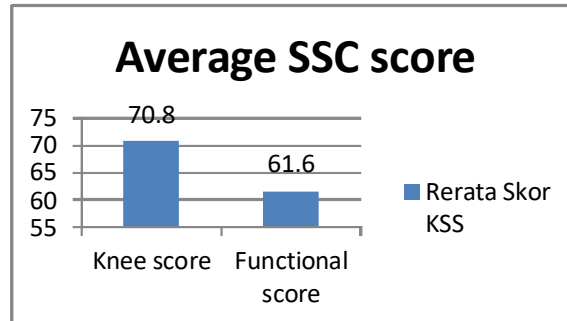
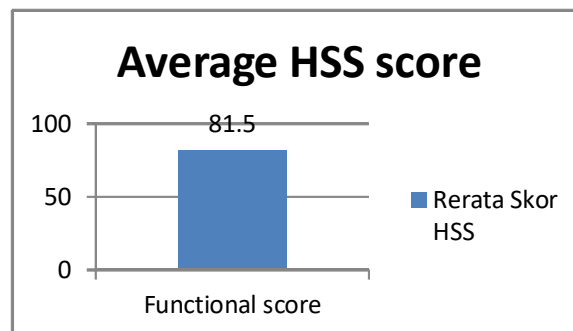


Figure 3. Average KOOS score



**Figure 4.** Average SSC score



**Figure 5.** Average HSS score

## DISCUSSION

During 2010 until 2015 there were 18 high tibial osteotomy operations at Dr. Soetomo Hospital Surabaya, Al - Irsyad Hospital Surabaya, and Husada Utama Hospital Surabaya were operated by the same operator with open wedge high tibial osteotomy (OWHTO) methods. However, of the 18 surgeries, only 6 surgeries (knees that had undergone surgery) met the inclusion criteria while eleven others did not meet the inclusion criteria because they were not willing to be examined. The data obtained is a little due to the limited distance of the patient's house with a remote hospital so that patients prefer to seek treatment at a nearby hospital. In addition, there are some patients who refuse to control and refuse to do a home visit. The results of the study found more female patients than men. This is in accordance with epidemiological studies that show more people with knee OA in women than men who are done elsewhere such as in the United States and Egypt. This may

be related to the hypothesis that the number of people with OA is due to hormonal factors, namely reduced estrogen levels and progesterin at the age of menopause (Slevin, 2016; Sun, 2016).

A survey from the National Health and Nutrition Examination Survey (NHANES III) shows that most OA sufferers are over 60 years old. The results showed that age >55 years was more than the others. Age increase is the most important risk factor for knee OA. The proportion of people with knee OA increases with age in the population in both women and men. Increased prevalence and incidence of OA at older ages is thought to result from the accumulation of exposure to various risk factors and biological changes that occur in the aging process such as cartilage depletion, decrease in muscle strength, decreased proposition and oxidative damage (Ihle, 2016).





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Knee Injury and Osteoarthritis Outcome Score (KOOS) is one of the most commonly used assessments to evaluate therapy in knee OA. KOOS is a patient-administered scoring. There are five domains on KOOS, namely: (1) pain, (2) complaints of swelling, grinding, clicking, and restriction of motion, (3) ability to carry out daily activities, (4) ability to do sports and recreational activities, and (5) quality of life of patients related to patient complaints. All questions will be assessed on a scale of 0 - 4. The five domains are assessed separately and then added to a total score of 0 to 100 where "0" is the worst and "100" is the best. According to Collins et al. Who conducted a comparative study on various scoring systems, KOOS was considered to meet the criteria to be used as an assessment tool for both clinical and research interests. In this study, the mean of each component sequentially between the components of pain, complaints, daily activities, sports and recreation, and quality of life was 77.7; 70.3; 76.2; 47.9; 74,1. When compared with a study conducted by Kievit et al in the Netherlands in 2013, the results were not much different, namely: the average KOOS score for pain was 76.8 (95% CI: 74.9-78.8), for complaints was 73.2 (95% CI: 71.5-74.8), for daily activities it was 73.5 (95% CI: 71.5-75.5), for sports and recreation was 38.3 (95% CI: 35, 5-41,1), and for quality of life is 60.0 (95% CI: 57,7-62,3) (Wang, 2016).

The Knee Society Score (KSS) was introduced in 1989. This questionnaire is observer-administered which contains two components, namely the first is a clinical assessment of the knee and the second is a functional assessment seen from the overall patient performance. The aim of the distribution of the two components is to make the clinical assessment of the knee more independent and not affected by functional judgments that

can change due to comorbidity and increasing age. Clinical assessment of the knee is done through a physical examination which includes: pain, stability, and joint movement. Functional assessment evaluates the patient's ability to walk and climb and downstairs. In this study, the SSC score consisted of two components, namely the component knee score which was measured objectively by the examiner and the functional score component assessed by answering the questionnaire by the patient. In this study, we are not evaluated knee score and functional score pre-operative, this study produced a knee score and functional score of 70.6 and 61.6 respectively. Studies evaluating High Tibial Osteotomy with SCC have been carried out by Schroer et al with a mean knee score and the functional score of 92.0 and 73.8 (Kolb, 2010).

Modified Hospital For Special Surgery Knee Scoring was first introduced by Dr. Insall in 1993, this score included an objective assessment based on clinical and functional parameters. Consists of 100 points (maximum value) which indicates the maximum function of the knee. In this study obtained a value of 81.5. This is almost similar to the study conducted by Narin et al. Who obtained a HSS functional average score after 1-year follow-up was 85.1 (Kolb, 2010).

### CONCLUSION

With many types of surgery options for patients with Osteoarthritis, and looking at the clinical evaluation of postoperative patients at the Regional General Hospital Dr. Soetomo Surabaya, Husada Utama Hospital Surabaya, Al-Irsyad Hospital Surabaya, the High Tibial Osteotomy can be a good choice for patient satisfaction.



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