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RESEARCH ARTICLE

TO STUDY THE EFFECT OF COMBINED ANTEVERSION IN TOTAL HIP REPLACEMENT

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Key words:-
Arthoplasty, Hip Replacement, Prosthesis

Abstract

Introduction: In normal day-to-day life, the hip joint is the type of joint that undergoes a lot of stress during a person's normal daily activities. Since the hip joint is a vital joint that supports all joints in the body, normal and proper functioning of this joint is essential for maintaining a pain-free daily life.The overall success rate of total hip arthroplasty is largely determined by its ability to maintain hip stability and mobility while reducing pain in associated hip pathologies. The total joint replacement situation is in a state of constant development. Phillip Wiles was the first total hip replacement surgeon in London in 19381. Accurate positioning of the femoral and acetabular components is considered a prerequisite for successful total hip arthroplasty4-8. The optimal position of the stem and cup is an average anteversion angle of approximately 37 degrees (range: 25 to 50 ◦) 9-11 to avoid impingement and/or dislocation. Cup-to-stem or bone-to-bone impingement causes dislocation, accelerated wear, and pain in patients undergoing total hip replacement 12. McKibbin 13 first introduced the term in a study of infant cadavers and defined a total anteversion of 30 to 40 with his 15 anteversion of the femur as normal. Lewinnek8 defined his zone of safe cup alignment as his tilt of 40° ± 10° and his anteversion (AV) of 15° ± 10°.The Ranawat test is a visual assessment of compound anteversion when the femoral neck and head are flush with the acetabular opening. The angle of internal rotation to make the head and socket coplanar is combined anteversion.14 Therefore, dislocation is an important and critical complication which has to be avoided. In our study we are calculating combined version in total hip arthroplasty which will helpful in assessing the cup position post operatively with this we can assess the relation of stability of hip and functional outcome. Getting combined anteversion in safe zone of 40◦ ± 10◦ is important for surgeon to give patients a comfortable daily activities of living.

Result: In our study, the mean total score was 90.10 ± 7.59in the postoperative 6 months period. Postoperative functional outcomes by Harris Hip Score at the end of the 6 months follow-up study were excellent in 17 patients (56.7%) and good in 11 patients(36.7%). Majority of the patients had good to excellent Harris Hip Score at final outcome with mean combined version 25-50%.

Conculsion: The outcome of total hip arthroplasty performed depends on several factors, including component design, patient selection, mean bond angle, and surgical technique, determined by the outcome of the

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procedure should be evaluated in long-term studies. Our study suggests a favorable prognosis and outcome in the 20–60-year-old group with a mean age of 33.4. Of the 30 patients tested, 29 had a favorable postoperative outcome with normal range of combined version whose functional outcome is measured by the Harris Hip Score. The prosthesis's success and longevity depend on the restoration of the hip joint's biomechanics .The goal was always to get the center of rotation back, limb length, medial and vertical offsets. Although this study was not without complications, the overall functional and clinical outcomes were excellent. Our study will require further follow-up and new patients as we were unable to obtain concrete results due to the small sample size.

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Introduction:-

In normal day-to-day life, the hip joint is the type of joint that undergoes a lot of stress during a person's normal daily activities. Since the hip joint is a vital joint that supports all joints in the body, normal and proper functioning of this joint is essential for maintaining a pain-free daily life.The overall success rate of total hip arthroplasty is largely determined by its ability to maintain hip stability and mobility while reducing pain in associated hip pathologies. The total joint replacement situation is in a state of constant development. Phillip Wiles was the first total hip replacement surgeon in London in 1938[1]. McKee and Farrar were pioneers in advancing the technology of total hip replacement surgery in the late 1950s. Charnley used biomechanical principles of the hip joint in the late 1960s to overcome the problems associated with the design of artificial hip joints[2,3]. Evaluation of long-term outcomes of any surgical procedure is important to determine the durability and effectiveness of that procedures like uncemented total hip replacement (THR). Accurate positioning of the femoral and acetabular components is considered a prerequisite for successful total hip arthroplasty[4-8]. The optimal position of the stem and cup is an average anteversion angle of approximately 37 degrees (range: 25 to 50 ◦) [9-11] to avoid impingement and/or dislocation. Cup-to-stem or bone-to-bone impingement causes dislocation, accelerated wear, and pain in patients undergoing total hip replacement [12].

The accuracy of femoral stem anteversion and acetabular cup anteversion ensures that the femoral head fits within the cup without the two colliding in all positions. This requires a technique to repeatedly generate this coupled forward lean. Combined hip anteversion refers to the sum of acetabulum and femoral anteversion. In total hip arthroplasty, this means the sum of socket and stem anteversion.

McKibbin [13] first introduced the term in a study of infant cadavers and defined a total anteversion of 30 to 40 with his 15 anteversion of the femur as normal. Lewinnek[8] defined his zone of safe cup alignment as his tilt of 40° ± 10° and his anteversion (AV) of 15° ± 10°.The Ranawat test is a visual assessment of compound anteversion when the femoral neck and head are flush with the acetabular opening. The angle of internal rotation to make the head and socket coplanar is combined anteversion.[14]

Therefore, dislocation is an important and critical complication which has to be avoided. In our study we are calculating combined version in total hip arthroplasty which will helpful in assessing the cup position post operatively with this we can assess the relation of stability of hip and functional outcome. Getting combined anteversion in safe zone of 40◦ ± 10◦ is important for surgeon to give patients a comfortable daily activities of living.

There are very few studies sharing this association, hence we decided to retrospectively assess in our institute.

Material & Methods:-

This was an analytical cross-sectional study where in consecutive cases Of Osteonecrosis for head of femur , which presented to Sri Aurobindo Medical College & PG Institute Indore M.P India between the period of April 2021 to September 2022 were included.

A total of 30 Cases were Included, 20 each for operative and conservative management for osteonecrosis of femur head were taken up for the study at Sri Aurobindo Medical College & PG Institute Indore M.P India

Patients meeting our inclusion criteria were those who were above the age of 18 years,&Patient not giving consent for study.All patients undergoing total hip arthroplasty.

Patients with anaverage follow-up time of 6 months were evaluated with theModified Harris Hip Score Evaluation.

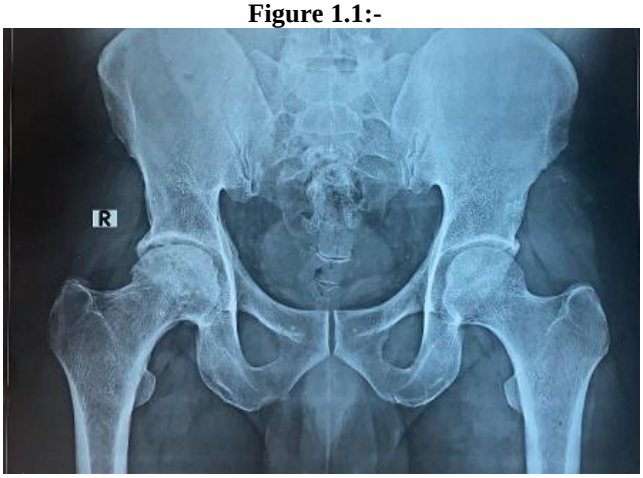
Patients participating in this study were called for regular follow up for every 3 weeks, 6 week, 3 months and 6 months and dash score was obtained for our study of functional outcome of mid shaft clavicular fractures.

Radiological outcome was analysed to check the union by checking the xrays at regular intervals.

Statistical analysis was executed with an unpaired t-test in order to assess the significant differences between the 2 groups.All the data was feed in excel sheet and significants results were obtained .

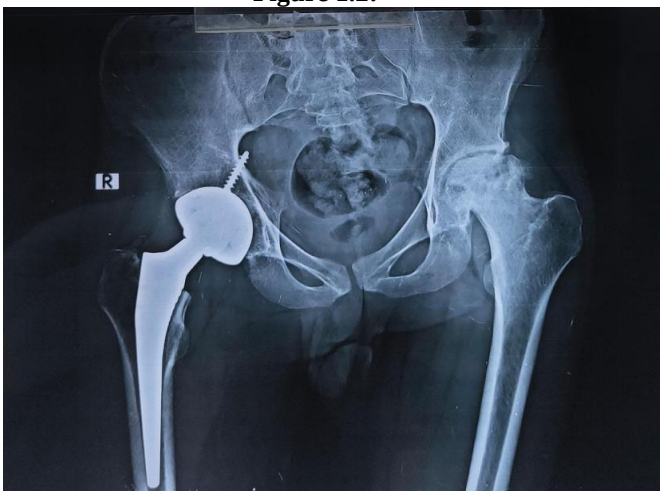
Cases
Case 1:

Figure 1.1:-



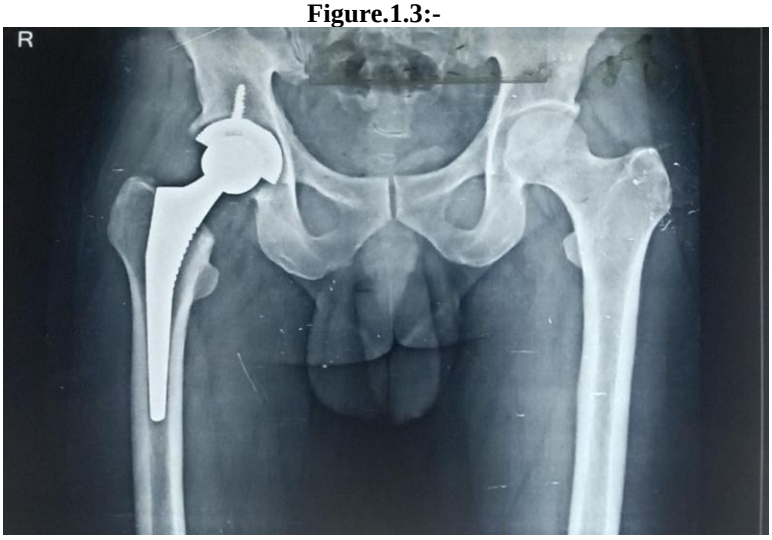
Pre OP.

Figure 1.2:-



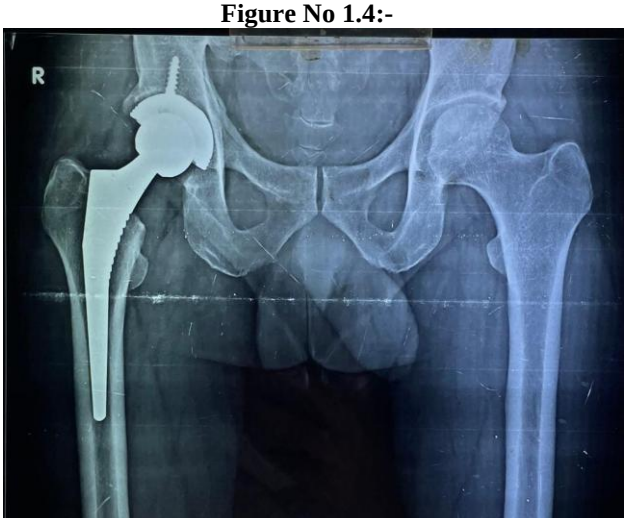
Post OP

Figure.1.3:-



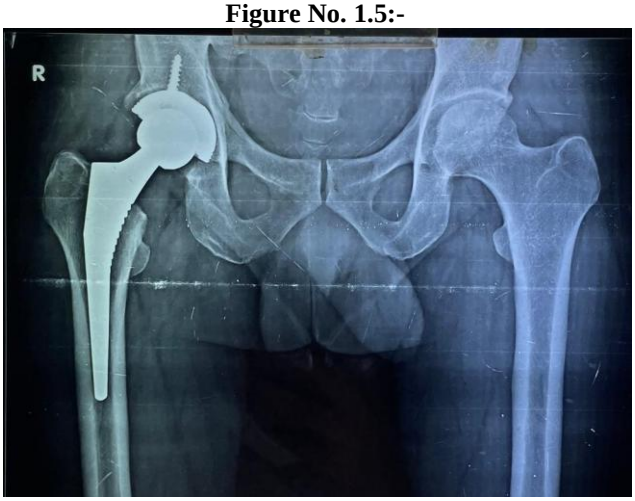
Post OP 1 Month

Figure No 1.4:-



Post Op 3 Month

Figure No. 1.5:-



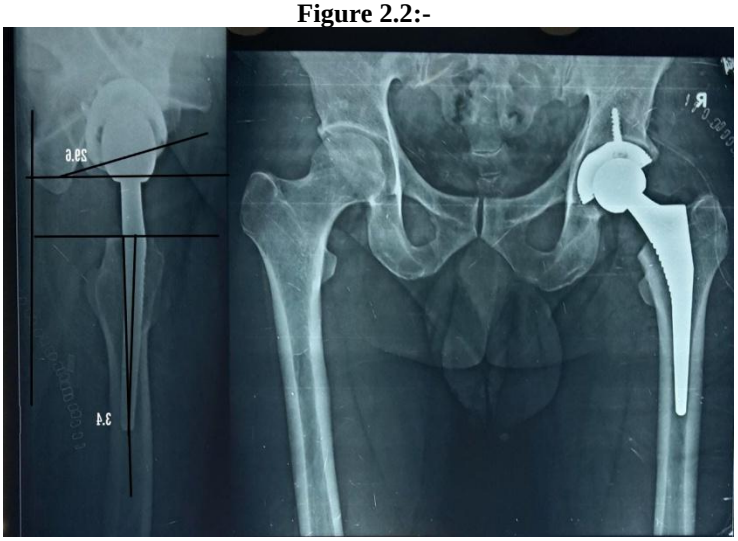
Post Op 6 Month

Case 2

Figure 2.1:-

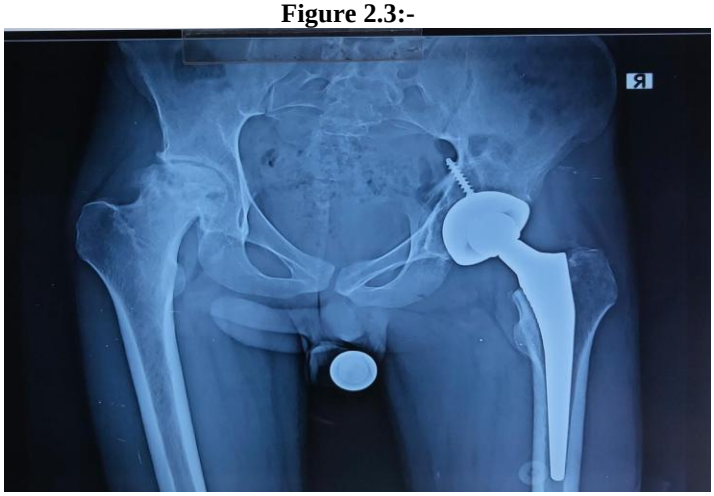
Pre Op Xray

Figure 2.2:-



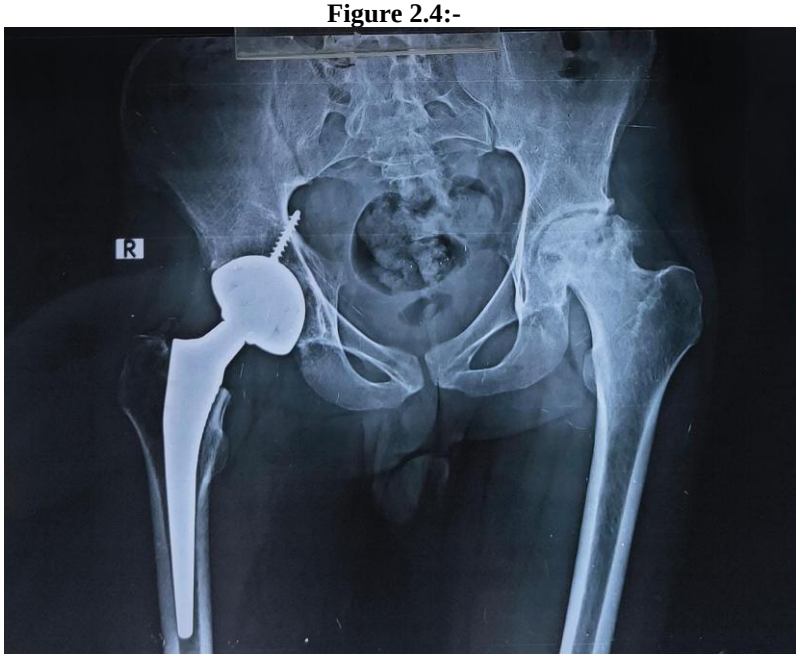
Post Op Xray

Figure 2.3:-



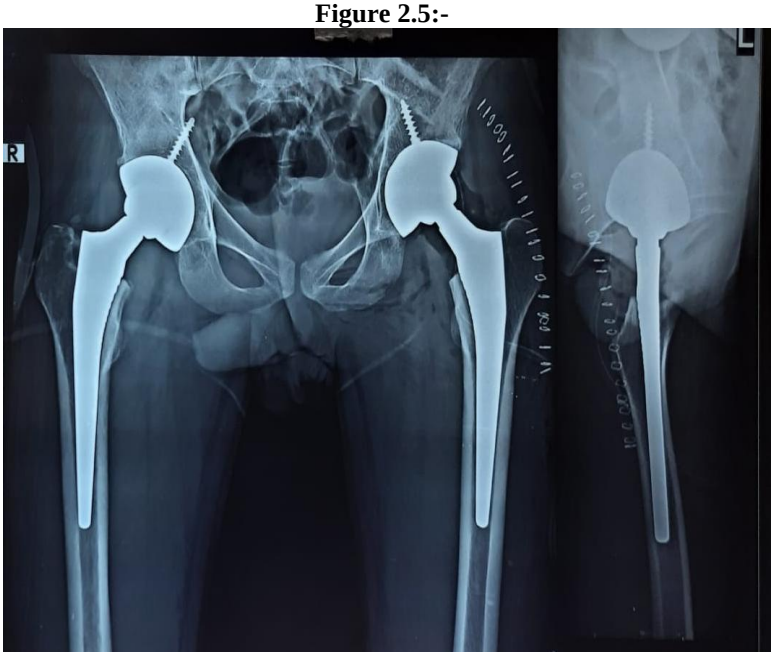
Post Op 1 Month

Figure 2.4:-



Post Op 3 Month

Figure 2.5:-



Post Op 6 Month

Result:-

30 cases were examined between April 2021 and September 2022.The results of this study are compared with known similar studies from the Western literature.

Our study sample 30 in which 12 (40%) patients were in the age group 20-30 years, 10 (33.3%) patients were in the age group 30-40 years, 4 (13.3%) patients were in the age group 40-50 years and 4 (13.3%) patients were in the age group more than 50 years. Majority of the patients were in the age groups 20-30 years and 30-40 years.The mean age of the patients was 33.83 ± 10.75 years (range: 20 years to 57 years.)

Table No. 11:- Comparison of different studies.

S. No.	Study	Year	Sample Size	Mean Combined version	Harris Hip Score
1	Shigeo Fukunishi et al	2012	79	44.4°±11.2°	Good
2	Li Li et al	2020	545	23.1° ± 13.4°	Excellent
3	Patrick B. O'Connor et al	2021	100	35°- 55°	Excellent
4	Our Study	2022	30	25°- 50°	Good-Excellent

The immediate success of hip arthroplasty is determined by the patient's ability to return to the maximum possible level of functional activity. In this way, the patient's pain and mobility are maximally assessed. Patients with chronic arthritis are incapacitated by pain and limitation of movement, so alleviation of these two factors is critical to the satisfactory outcome of surgery. Restoring the biomechanics of the hip joint is critical to the good outcome and longevity of the prosthesis. In all cases I tried to restore the center of rotation, limb length, medial and vertical offsets.

We thought that maintaining substantial activity was important for bone remodeling and osseo-integration. Only activities that do not put a lot of stress on your joints, such as swimming, cycling, and walking, are recommended. Activities that increase joint stress include sitting cross-legged, squatting on the toilet, and strenuous physical activity. , hip pain indicates loosening of the acetabular component. Our study used the modified Harris hip score to assess functional outcome. According to the Harris Hip Score, patients are divided into four groups according to the final outcome of the Harris Hip Score after 6 months follow-up
< 70 -Poor
70 – 79 – Fair
80 – 89 – Good
90 – 100 - Excellent

In our study, the mean total score was 90.10 ± 7.59in the postoperative 6 months period.

Postoperative functional outcomes by Harris Hip Score at the end of the 6 months follow-up study were excellent in 17 patients (56.7%) and good in 11 patients(36.7%). Majority of the patients had good to excellent Harris Hip Score at final outcome with mean combined version 25-50%.

Discussion:-

Total hip arthroplasty (THA) is the most important treatment for the late stage of hip osteoarthritis, femoral head necrosis, as well as many hip diseases and achieves great success[15]. Dislocation commonly occurs after THA and this is believed to be the main cause leading to revision within the first 2 years after operation[16]. There are numerous factors associated with dislocation. Among them, the implant orientation, as an important evaluation of implant factors, plays a particularly critical role in the stability of prostheses. The implant orientation mainly includes the anteversion and inclination of the cup and the anteversion of the femoral head component.

In summary, the outcome of total hip arthroplasty performed depends on several factors, including component design, patient selection, mean bond angle, and surgical technique, determined by the outcome of the procedure should be evaluated in long-term studies. Our study suggests a favorable prognosis and outcome in the 20–60-year-old group with a mean age of 33.4. Of the 30 patients tested, 29 had a favorable postoperative outcome with normal range of combined version whose functional outcome is measured by the Harris Hip Score.

The prosthesis's success and longevity depend on the restoration of the hip joint's biomechanics .The goal was always to get the center of rotation back, limb length, medial and vertical offsets. Although this study was not without complications, the overall functional and clinical outcomes were excellent. Our study will require further follow-up and new patients as we were unable to obtain concrete results due to the small sample size.

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