

## Outcome Analysis of Neglected Musculoskeletal Injuries of Hip

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### **Absract**

**Background:** In our study the focus is on periarticular unreduced fractures involving the hip joint which are serious injuries resulting from both high velocity and low velocity trauma. Old unreduced dislocations of hip are relatively uncommon in adults but in our hospital we have seen many cases presenting with neglected hip dislocation and neglected neck of femur fractures with a minimum period of neglect of 1 week. Due to the increased need for preservation of biological hip in Indians we have attempted to devise a strategy for treatment of these neglected injuries to produce the best outcome possible for the patient.

**Materials And Methods:** 96 patients with neglected hip injuries were selected based on a set criteria and was put on a treatment protocol according to various factors like age, outcome expected, occupation of the patient etc and they evaluated at three stages pre intervention, intervention and post intervention stage. Then after a serial follow up period of minimum 1 year the final outcome was recorded.

**Results:** In our study neglected trochanteric fractures had a better outcome when compared to neglected neck of femur that underwent fixation of fractures. In neck of femur fracture that underwent prosthetic replacements had better outcome than fracture fixations of neglected neck of femur fractures

**Conclusion:** In conclusion we have proven that irrespective of duration of neglect surgical procedures for neglected injuries are always better than watchful neglect. The complications and outcome in all the cases depended on many factors as even in some cases with longer neglect duration excellent outcome was possible but in some cases with shorter neglect duration also fair outcome was only possible.

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Date of Submission: 09 -09-2017

Date of acceptance: 20-09-2017

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### **I. Introduction**

Musculoskeletal injuries are major causes of death and disability all over the world, especially in a developing country like India<sup>1</sup>. There is increased incidence of trauma induced musculoskeletal injuries due to various factors like increased usage of motorized vehicles in combination with bad roads<sup>2</sup>, accidental farm injuries or workplace injuries, fractures following trivial fall especially in geriatric population and associated co-morbid conditions. Musculoskeletal injuries following trauma is part of a spectrum of musculoskeletal disorders which has become a rising epidemic in a country present in developing stage like India<sup>3</sup>. These disorders as part of Non-communicable diseases<sup>1</sup> are responsible for heavy economic burden on a developing nation<sup>3</sup>.

In our study the focus is on periarticular unreduced fractures, fracture dislocations, and isolated neglected dislocations involving the hip joint with an overall period of neglect of minimum 1 week. Fractures involving the hip joint are considered as serious injuries. In Indians there is a necessity for squatting or cross-legged sitting so there is a need for the preservation of Biological Hip joint. Traumatic dislocation of hip is truly an orthopedic emergency. Failure to recognize and treat it early leads to significant poor prognosis. Old unreduced dislocations of hip are relatively uncommon in adults. It may go unrecognized in a few poly trauma cases with head injury and fracture dislocation of the contralateral hip. The previously described causative factors are going to be studied in detail and the proportion of neglected injuries for each factor is proposed to be calculated for the given study period separately.

These patients were included based on set criteria and patient specific management protocol was devised to achieve better clinical, functional and radiological improvement when compared to the parameters during the time of presentation. The outcome variations with age, gender, duration of neglect, reason for neglect, were all studied. This study also aims to devise counselling and awareness spreading techniques to prevent the causative factors therefore decreasing the occurrence of burden due to neglected musculoskeletal injuries involving hip joint.

## II. Materials And Methods

This study, which is a prospective and retrospective study, was conducted after getting approval from Institutional Ethical Committee. This study was conducted during the period of January 2015 to December 2015. 96 patients from Institute of Orthopedics & Traumatology Rajiv Gandhi Government General Hospital, Chennai were selected based on set criteria. All patients were selected after getting informed consent. Out of 96 cases 67 cases were natively treated and 29 cases reported without any treatment. The 29 cases which had presented without any treatment included 19 cases from rural areas with poor accessibility to orthopedic specialty hospital and 10 cases with lack of proper care givers

### Criteria for selection of neglected cases:

- Age 14- 60 years
- Both gender
- Injury to intervention interval – 1 Week
- History of neglect of injury due to various reasons

### Follow up treatment protocol

General postoperative protocol followed was:

- Patient customized
- Parenteral Antibiotics therapy were given for 5 days to 1 week
- Indomethacin was started in all the cases on 1<sup>st</sup> postoperative day and was continued for 2 weeks

### Exclusion criteria

The following cases were excluded from the study as they might alter the outcome of the study.

- Intra articular fractures
- Physeal injuries
- Polytrauma patients
- Grossly contaminated open injuries
- Injuries of the spine
- Implant/prostheses failures

### Pre-intervention stage:

The patient presented to our hospital with a range of period of neglect of 1 week to 144 weeks. The patients presented with pain and moderate to severe restrictions of activities of daily living. In young individuals the procedure was done as soon as possible where as in patients with associated comorbidities complete medical evaluation was done and then taken up for surgery. Radiological examination was done in all the cases which constituted pelvis and both hip X-ray in traction and internal rotation view. The remnant neck present was assessed for neck of femur cases and MRI was done to assess the vascular viability in cases with duration of neglect more than 10 days for whom fixation was planned.

### Intervention stage:

The procedure for the patients were done based on age, duration of neglect, bone stock and associated comorbidities. Among the 31 intertrochanteric fractures cases 24 cases had undergone dynamic hip screw fixation and among them 8 cases had needed bone grafting. And in remaining 7 cases, 4 cases had proximal femoral nailing done and 3 cases which had subtrochanteric extension Dynamic condylar screw fixation was done with bone grafting. Among the 3 cases with neglected dislocation of hip, 1 case which had associated protrusion acetabuli Total hip replacement with anti-protrusion cage was done, for the second case Girdlestonearthroplasty was done and in the third case Steinmann pin transfixation from greater trochanter to acetabulum. 56 cases had neck of femur fractures, out of them total hip replacement was done in 15 cases, bipolar hemiarthroplasty was done in 16 cases, valgus osteotomy and dynamic hip screw fixation was done in 2 cases, cancellous screw fixation was done in 22 cases.

**Table 1:** Diagnosis and procedure done for neglected injuries involving Hip joints

| Case no. | Duration of neglect | Diagnosis of the cases                    | Procedure done  |
|----------|---------------------|---|---|
| 1.       | 1 week              | Greater trochanteric fracture right femur | Open reduction and internal fixation with tension band wiring |
| 2.       | 8 weeks             | Neck of femur fracture right side         | Dynamic hip screw fixation with valgus osteotomy              |

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|     |          |   |   |
|-----|----------|---|---|
| 3.  | 4 weeks  | Intertrochanteric fracture right femur                | Open reduction and internal fixation with Dynamic hip screw fixation with bone grafting |
| 4.  | 20 weeks | Neck of femur fracture right side                     | Bipolar hemiarthroplasty  |
| 5.  | 12 weeks | Neck of femur fracture right side                     | Total hip replacement   |
| 6.  | 2 weeks  | Left side intertrochanteric fracture femur            | Open reduction and internal fixation with Dynamic hip screw fixation with bone grafting |
| 7.  | 3 weeks  | Left side intertrochanteric fracture femur            | Dynamic hip screw fixation  |
| 8.  | 4 weeks  | Neck of femur fracture right side                     | Bipolar hemiarthroplasty  |
| 9.  | 20 weeks | Nonunion neck of femur fracture left side             | Total hip replacement   |
| 10. | 3 weeks  | Left side Intertrochanteric fracture femur            | Dynamic hip screw fixation  |
| 11. | 2 weeks  | Left side intertrochanteric fracture femur            | Dynamic hip screw fixation  |
| 12. | 1 week   | Intertrochanteric fracture left femur                 | Dynamic hip screw fixation  |
| 13. | 1 week   | Neck of femur fracture left side                      | Bipolar hemiarthroplasty  |
| 14. | 12 weeks | Neck of femur fracture left side                      | Total hip replacement   |
| 15. | 1 week   | Neck of femur fracture right side                     | Bipolar hemiarthroplasty  |
| 16. | 1 week   | Neck of femur fracture right side                     | Cancellous screw fixation   |
| 17. | 1 week   | Neck of femur fracture right side                     | Cancellous screw fixation   |
| 18. | 2 weeks  | Intertrochanteric fracture femur right side           | Dynamic hip screw fixation  |
| 19. | 1 week   | Neck of femur fracture right side                     | Cancellous screw fixation   |
| 20. | 12 weeks | Left side intertrochanteric fracture femur            | Open reduction and internal fixation with dynamic hip screw and bone grafting           |
| 21. | 2 weeks  | Left side intertrochanteric fracture femur            | Dynamic hip screw fixation  |
| 22. | 1 week   | Cervicotrochanteric fracture femur left side          | Dynamic hip screw fixation  |
| 23. | 2 weeks  | Neck of femur fracture right side                     | Cancellous screw fixation   |
| 24. | 3 weeks  | Neck of femur fracture right side                     | Total hip replacement   |
| 25. | 12 weeks | Neck of femur fracture left side                      | Total hip replacement   |
| 26. | 8 weeks  | Neck of femur fracture left side                      | Bipolar hemiarthroplasty  |
| 27. | 1 week   | Neck of femur fracture left side                      | Cancellous screw fixation   |
| 28. | 1 week   | Left side intertrochanteric fracture femur            | Dynamic hip screw fixation  |
| 29. | 1 week   | Neck of femur fracture left side                      | Dynamic hip screw fixation with valgus osteotomy  |
| 30. | 12 weeks | Malunited intertrochanteric fracture femur right side | Conservative  |
| 31. | 1 week   | Neck of femur fracture right side                     | Cancellous screw fixation   |
| 32. | 2 weeks  | Right side intertrochanteric fracture femur           | Dynamic hip screw fixation  |
| 33. | 96 weeks | Fracture neck of femur with arthritis left hip        | Total hip replacement   |
| 34. | 1 week   | Intertrochanteric fracture femur right side           | Dynamic hip screw fixation  |
| 35. | 2 weeks  | Intertrochanteric fracture femur right side           | Dynamic hip screw fixation  |
| 36. | 2 weeks  | Neck of femur fracture right side                     | Bipolar hemiarthroplasty  |
| 37. | 2 weeks  | Neck of femur fracture right side                     | Dynamic hip screw fixation with valgus osteotomy  |
| 38. | 1 week   | Neck of femur fracture right side                     | Cancellous screw fixation   |
| 39. | 1 week   | Intertrochanteric fracture right side                 | Dynamic hip screw fixation  |
| 40. | 1 week   | Intertrochanteric fracture femur right side           | Dynamic hip screw fixation  |
| 41. | 1 week   | Closed impacted neck of femur fracture left side      | Total hip replacement   |
| 42. | 1 week   | Neck of femur fracture right side                     | Dynamic hip screw fixation  |
| 43. | 1 week   | Neck of femur fracture left side                      | Cancellous screw fixation   |
| 44. | 1 week   | Neck of femur fracture left side                      | Cancellous screw fixation   |
| 45. | 2 weeks  | Neck of femur fracture left side                      | Bipolar hemiarthroplasty  |
| 46. | 6 weeks  | Neck of femur fracture right side                     | Total hip replacement   |
| 47. | 1 week   | Neck of femur fracture right side                     | Cancellous screw fixation   |
| 48. | 2 weeks  | Intertrochanteric fracture femur right side           | Open reduction and internal fixation with dynamic hip screw and bone grafting           |
| 49. | 2 weeks  | Impacted neck of femur fracture right side            | Conservative  |
| 50. | 12 weeks | Neck of femur fracture right side                     | Cancellous screw fixation   |

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|     |           |  |   |
|-----|-----------|--|---|
| 51. | 190 weeks | Non-union Subtrochanteric fracture femur with intertrochanteric extension right side | Open reduction and internal fixation with proximal femoral nailing                    |
| 52. | 8 weeks   | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 53. | 1 week    | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 54. | 2 weeks   | Neck of femur fracture right side  | Dynamic hip screw fixation  |
| 55. | 1 week    | Neck of femur fracture left side   | Cancellous screw fixation   |
| 56. | 1 week    | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 57. | 8 weeks   | Intertrochanteric fracture non-union femur left side                                 | Open reduction and internal fixation with proximal femoral nailing with bone grafting |
| 58. | 4 weeks   | Neck of femur fracture left side   | Total hip replacement   |
| 59. | 21 weeks  | Neck of femur fracture right side with avascular necrosis                            | Total hip replacement   |
| 60. | 1 week    | Neck of femur fracture left side   | Bipolar hemiarthroplasty  |
| 61. | 1 week    | Intertrochanteric fracture femur left side   | Closed reduction and proximal femoral nailing   |
| 62. | 4 weeks   | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 63. | 21 weeks  | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 64. | 24 weeks  | Head and neck of femur fracture right side   | Bipolar hemiarthroplasty  |
| 65. | 2 weeks   | Intertrochanteric fracture left side   | Dynamic hip screw fixation  |
| 66. | 2 weeks   | Intertrochanteric fracture right side  | Open reduction and internal fixation with proximal femoral nailing                    |
| 67. | 48 weeks  | Acetabulum fracture with protrusio acetabuli   | Total hip replacement with anti protrusio cage  |
| 68. | 1 week    | Posterior dislocation right hip  | Open reduction and capsular repair  |
| 69. | 2 weeks   | Neck of femur fracture left side   | Total hip replacement   |
| 70. | 2 weeks   | Intertrochanteric fracture femur right side  | Open reduction with dynamic hip screw fixation  |
| 71. | 12 weeks  | Intertrochanteric fracture femur right side  | Open reduction internal fixation with dynamic hip screw and bone grafting             |
| 72. | 2 weeks   | Neck of femur fracture right side  | Closed reduction and cancellous screw fixation  |
| 73. | 4 weeks   | Intertrochanteric fractures left femur   | Open reduction and internal fixation with dynamic condylar screw with bone grafting   |
| 74. | 12 weeks  | Malunited intertrochanteric fracture right femur                                     | Conservative  |
| 75. | 12 weeks  | Intertrochanteric fracture femur right side  | Open reduction and internal fixation with dynamic condylar screw and bone grafting    |
| 76. | 8 weeks   | Neck of femur fracture left side   | Total hip replacement   |
| 77. | 4 weeks   | Neck of femur fracture left side   | Bipolar hemiarthroplasty  |
| 78. | 1 week    | Neck of femur fracture right side  | Closed reduction and cancellous screw fixation  |
| 79. | 2 weeks   | Neck of femur fracture right side  | Open reduction and cancellous screw fixation  |
| 80. | 8 weeks   | Neck of femur fracture left side   | Total hip replacement   |
| 81. | 4 weeks   | Intertrochanteric fracture right side  | Open reduction and internal fixation with dynamic hip screw with bone grafting        |
| 82. | 24 weeks  | Intertrochanteric fracture right femur   | Open reduction and internal fixation with dynamic condylar screw and bone grafting    |
| 83. | 1 week    | Intertrochanteric fracture right femur   | Dynamic hip screw fixation  |
| 84. | 2 weeks   | Intertrochanteric fracture left femur  | Open reduction and internal fixation with dynamic hip screw                           |
| 85. | 8 weeks   | Intertrochanteric fracture right femur   | Open reduction and internal fixation with dynamic condylar screw and bone grafting    |
| 86. | 1 week    | Neck of femur fracture left side   | Closed reduction and cancellous screw fixation  |
| 87. | 4 weeks   | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 88. | 36 weeks  | Neck of femur fracture right side  | Bipolar hemiarthroplasty with adductor tenotomy                                       |
| 89. | 2 weeks   | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 90. | 2 weeks   | Neck of femur fracture right side  | Bipolar hemiarthroplasty  |
| 91. | 8 weeks   | Neck of femur fracture left side   | Total hip replacement with adductor tenotomy  |
| 92. | 24 weeks  | Neck of femur fracture left side   | Total hip replacement   |
| 93. | 5 week    | Posterior dislocation of hip   | Open reduction with Steinmann pin trans fixation of greater trochanter to acetabulum  |
| 94. | 8 weeks   | Neck of femur fracture left side   | Total hip replacement   |
| 95. | 1 week    | Neck of femur fracture right side  | Total hip replacement   |
| 96. | 3 weeks   | Anterior dislocation of hip obturator type   | Girdlestonearthroplasty   |

**Post intervention stage:**

For intertrochanteric fracture fixed with dynamic hip screw, mobilization was begun based on the intra operative reduction achieved and the challenges faced in the process. In some cases, the patients were mobilized with walker even on the next day of surgery while in few cases; mobilization was prevented even up to 4 weeks.

In cases in which proximal femoral nailing and dynamic condylar screw fixation was done the mobilization was begun bases on intra operative reduction obtained. But in all the cases muscle strengthening exercises were started the very next post-operative day, to strengthen the weakened musculature caused due to disuse in the neglected limb. In cases where prosthetic replacement procedure was done weight bearing was initiated as early as possible. Harris Hip Score is used commonly to analyze the outcome of surgeries of the hip and to evaluate various hip disabilities and the modalities of treatment in adults.

**Table 2:** Grading system for Harris hip score

| Grade  | Score     |
|--------|-----------|
| 90-100 | Excellent |
| 80-89  | Good      |
| 70-79  | Fair      |
| <70    | Poor      |

**Statistical analysis:**

Statistical analysis was done using SPSS software version 17. Mean and standard deviation for age, duration of neglect, scoring systems, visual analog scale pre and post procedure and post follow up was done. Comparison studies were done with confidence interval 95% and  $p < 0.05$ . Descriptive statistics were applied and frequency distribution was found for each joint parameter under evaluation. Sample proportion for neglected cases was determined

### III. Results

This prospective and retrospective study done during the period of January 2015 to December 2015 provided us with a large data of cases with joint injuries who came to our hospital including the patients who had come immediately after injury and also patient who had come after period of delay/neglect. This data was used to determine the extent of neglected musculoskeletal injuries around the major joints present in our society as a non-communicable disease. As the patients visiting our General Hospital were from Chennai and surrounding urban and rural areas this data could provide valuable insight regarding the neglected musculoskeletal injuries in our State of Tamil Nadu, Pondicherry Union Territory as well as neighbouring States of Seemandhra, Telengana and Karnataka.

**Age attributed proportion**

Based on the number of cases within each age group and the total number of neglected cases the age attributed proportion was calculated and a detailed analysis joint wise is given in Table -18. This has proved that increase in age is directly proportional to the increase in percentage of neglected cases. This proportion dramatically rises after the age of 50 years. Hence age has a direct relation with neglected musculoskeletal injuries proportion.

| Age range(in years) | Hip |
|---------------------|-----|
| 14-23               | 5   |
| 24-33               | 6   |
| 34-43               | 14  |
| 44-53               | 19  |
| 54-60               | 52  |
| Total               | 96  |

**Table 3:** Age attributed proportion

**Gender attributed proportion**

This calculation was done to determine the influence of gender on the proportion of neglected musculoskeletal injuries. Except in shoulder cases all other joint involvement showed increased neglected injuries among males than in females.

This may be due to:

- Increased exposure to the risk factors of musculoskeletal injuries in males.
- Decreased compliance and cooperation among females and their family members for a long orthopaedic management for neglected injuries.
- The general attitude in males towards seeking native treatment.

**Table 4: Gender Attributed Proportion**

|   |                  |              |  |
|---|------------------|--------------|--|
| <b>Gender attributed proportion</b>           | Males            | Females      | Total  |
|   | 56               | 40           | 96   |
| <b>Area of residence proportion</b>           | Urban            | Rural        | Total  |
|   | 35               | 61           | 96   |
| <b>Cause of neglect attributed proportion</b> | Native treatment | No treatment | Neglect in mentally challenged and destitute individuals |
|   | 67               | 29           | -  |

**Cause of neglect attributed proportion**

The proportion calculation was done based on the “cause of neglect” for all the joint injuries. The three major causes found in our study and their proportions were:

- Native treatment 69%
- No treatment - 19%, due to reasons like
  - Poor accessibility from rural areas 18%
  - General ignorance 1%

**IV. Outcome Analysis**

Totally 96 cases presented with neglected injuries involving hip joint. 56 cases were males and 40 were female patients. 35 patients were from urban areas and 61 patients were from rural areas. Duration of neglect ranged from 1 to 190 weeks, with mean  $\pm$ S.D was  $8.63 \pm 22.32$ . Pre procedure VAS mean  $\pm$ S.D was  $8.30 \pm 0.90$ . Post procedure VAS mean  $\pm$ S.D was  $1.56 \pm 0.81$ . At the end of follow up period of one year, 37 cases had excellent, 39 had good and 20 had fair outcomes. The mean functional score was 85 and the overall outcome was good. The functional range of motion achieved at the end of follow up period was assessed by the ability of the patient to do straight leg-raising against gravity in supine position and abduction in lateral position against gravity. The mean straight leg raising was  $40^\circ$  and mean abduction against gravity was  $30^\circ$ .

**Table 5: Post intervention Functional range of motion of Hip joint**

| Cases          | Hip in extension<br>Internal rotation<br>(In degrees) | Hip in extension<br>External rotation<br>(In degrees) | Hip in flexion<br>Internal rotation<br>(In degrees) | Hip in flexion<br>External rotation<br>(In degrees) |
|----------------|---|---|---|---|
| Mean $\pm$ S.D | $15 \pm 5.22$   | $35 \pm 4.31$   | $16 \pm 3.45$                                       | $34 \pm 3.13$                                       |

**Table 6: Pre and Post procedure evaluation for neglected injuries involving Hip joint**

| Case no. | Age | Gender | Duration of neglect(in weeks) | Pre procedure VAS | Post procedure VAS | Functional score |
|----------|-----|--------|-------------------------------|-------------------|--------------------|------------------|
| 1. H     | 45  | M      | 1 week                        | 9                 | 1                  | Excellent (92)   |
| 2. H     | 31  | M      | 8 weeks                       | 7                 | 1                  | Excellent (94)   |
| 3. H     | 57  | M      | 4 weeks                       | 8                 | 2                  | Good (83)        |
| 4. H     | 34  | F      | 20 weeks                      | 6                 | 2                  | Good (82)        |
| 5. H     | 58  | F      | 12 weeks                      | 7                 | 3                  | Fair (74)        |
| 6. H     | 60  | F      | 2 weeks                       | 8                 | 2                  | Excellent (96)   |
| 7. H     | 60  | M      | 3 weeks                       | 8                 | 2                  | Good (86)        |
| 8. H     | 80  | F      | 4 weeks                       | 8                 | 2                  | Good (85)        |
| 9. H     | 60  | M      | 20 weeks                      | 8                 | 3                  | Fair (77)        |
| 10. H    | 55  | M      | 3 weeks                       | 9                 | 1                  | Excellent (90)   |
| 11. H    | 57  | M      | 2 weeks                       | 9                 | 1                  | Excellent (93)   |
| 12. H    | 31  | M      | 1 week                        | 9                 | 1                  | Excellent (94)   |
| 13. H    | 60  | F      | 1 week                        | 9                 | 2                  | Good (87)        |
| 14. H    | 50  | F      | 12 weeks                      | 7                 | 1                  | Fair (74)        |

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|     |   |    |   |          |   |   |                |
|-----|---|----|---|----------|---|---|----------------|
| 15. | H | 60 | F | 1 week   | 9 | 1 | Excellent (96) |
| 16. | H | 35 | M | 1 week   | 9 | 3 | Fair (76)      |
| 17. | H | 51 | M | 1 week   | 9 | 1 | Excellent (97) |
| 18. | H | 35 | M | 2 weeks  | 9 | 0 | Good (84)      |
| 19. | H | 57 | F | 1 week   | 9 | 0 | Good (86)      |
| 20. | H | 60 | M | 12 weeks | 8 | 2 | Good (83)      |
| 21. | H | 50 | F | 2 weeks  | 9 | 1 | Excellent (92) |
| 22. | H | 14 | M | 1 week   | 9 | 0 | Excellent (94) |
| 23. | H | 14 | M | 2 weeks  | 9 | 1 | Good (81)      |
| 24. | H | 51 | M | 3 weeks  | 9 | 1 | Fair (77)      |
| 25. | H | 44 | M | 12 weeks | 7 | 2 | Good (84)      |
| 26. | H | 60 | F | 8 weeks  | 8 | 2 | Good (86)      |
| 27. | H | 60 | F | 1 week   | 9 | 1 | Excellent (95) |
| 28. | H | 60 | F | 1 week   | 9 | 1 | Excellent (94) |
| 29. | H | 60 | F | 1 week   | 9 | 1 | Good (87)      |
| 30. | H | 57 | M | 12 weeks | 8 | 3 | Fair (77)      |
| 31. | H | 55 | M | 1 week   | 8 | 2 | Good (88)      |
| 32. | H | 33 | F | 2 weeks  | 9 | 1 | Excellent (93) |
| 33. | H | 60 | F | 96 weeks | 7 | 2 | Good (89)      |
| 34. | H | 60 | M | 1 week   | 9 | 1 | Excellent (91) |
| 35. | H | 37 | M | 2 weeks  | 9 | 1 | Excellent (94) |
| 36. | H | 60 | F | 2 weeks  | 9 | 1 | Good (84)      |
| 37. | H | 45 | F | 2 weeks  | 9 | 1 | Good (86)      |
| 38. | H | 46 | M | 1 week   | 9 | 0 | Excellent (90) |
| 39. | H | 38 | M | 1 week   | 9 | 0 | Excellent (93) |
| 40. | H | 60 | F | 1 week   | 9 | 1 | Excellent (96) |
| 41. | H | 60 | M | 1 week   | 9 | 1 | Excellent (94) |
| 42. | H | 60 | F | 1 week   | 9 | 3 | Fair (73)      |
| 43. | H | 60 | M | 1 week   | 9 | 1 | Good (84)      |
| 44. | H | 60 | F | 1 week   | 9 | 1 | Good (83)      |
| 45. | H | 60 | F | 2 weeks  | 9 | 1 | Good (81)      |
| 46. | H | 43 | M | 6 weeks  | 8 | 2 | Good (87)      |
| 47. | H | 55 | F | 1 week   | 9 | 1 | Excellent (91) |
| 48. | H | 60 | M | 2 weeks  | 9 | 1 | Excellent (93) |
| 49. | H | 45 | M | 2 weeks  | 8 | 3 | Fair (77)      |
| 50. | H | 19 | M | 12 weeks | 7 | 2 | Good (86)      |

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|     |   |    |   |           |   |   |                |
|-----|---|----|---|-----------|---|---|----------------|
| 51. | H | 28 | M | 190 weeks | 6 | 2 | Good (88)      |
| 52. | H | 60 | M | 8 weeks   | 7 | 2 | Good (84)      |
| 53. | H | 60 | F | 1 week    | 9 | 2 | Good (83)      |
| 54. | H | 49 | F | 2 weeks   | 9 | 2 | Good (82)      |
| 55. | H | 45 | M | 1 week    | 9 | 1 | Excellent (92) |
| 56. | H | 53 | F | 1 week    | 9 | 1 | Excellent (95) |
| 57. | H | 35 | M | 8 weeks   | 7 | 2 | Good (86)      |
| 58. | H | 42 | M | 4 weeks   | 8 | 2 | Good (87)      |
| 59. | H | 40 | F | 21 weeks  | 6 | 1 | Good (89)      |
| 60. | H | 60 | F | 1 week    | 9 | 1 | Excellent (93) |
| 61. | H | 60 | M | 1 week    | 9 | 1 | Excellent (92) |
| 62. | H | 60 | M | 4 weeks   | 8 | 2 | Good (84)      |
| 63. | H | 60 | F | 21 weeks  | 7 | 3 | Fair (76)      |
| 64. | H | 40 | F | 24 weeks  | 7 | 3 | Fair (74)      |
| 65. | H | 60 | F | 2 weeks   | 9 | 1 | Excellent (91) |
| 66. | H | 30 | F | 2 weeks   | 9 | 0 | Excellent (94) |
| 67. | H | 45 | M | 48 weeks  | 7 | 2 | Good (83)      |
| 68. | H | 25 | M | 1 week    | 9 | 1 | Excellent (97) |
| 69. | H | 45 | F | 2 weeks   | 9 | 1 | Good (78)      |
| 70. | H | 17 | M | 2 weeks   | 9 | 1 | Excellent (96) |
| 71. | H | 60 | M | 12 weeks  | 8 | 3 | Fair (76)      |
| 72. | H | 40 | M | 2 weeks   | 8 | 2 | Good (86)      |
| 73. | H | 38 | M | 4 weeks   | 8 | 1 | Excellent (91) |
| 74. | H | 55 | F | 12 weeks  | 8 | 3 | Fair (77)      |
| 75. | H | 60 | M | 12 weeks  | 8 | 3 | Good (87)      |
| 76. | H | 60 | F | 8 weeks   | 8 | 3 | Fair (77)      |
| 77. | H | 56 | M | 4 weeks   | 8 | 2 | Good (89)      |
| 78. | H | 60 | F | 1 week    | 9 | 1 | Excellent (93) |
| 79. | H | 45 | M | 2 weeks   | 9 | 1 | Good (89)      |
| 80. | H | 45 | M | 8 weeks   | 7 | 2 | Fair (73)      |
| 81. | H | 54 | M | 4 weeks   | 7 | 2 | Excellent (92) |
| 82. | H | 60 | M | 24 weeks  | 6 | 2 | Fair (72)      |
| 83. | H | 55 | M | 1 week    | 9 | 1 | Excellent (96) |
| 84. | H | 42 | M | 2 weeks   | 9 | 1 | Excellent (92) |
| 85. | H | 60 | M | 8 weeks   | 9 | 2 | Fair (73)      |
| 86. | H | 60 | M | 1 week    | 9 | 1 | Excellent (98) |

|     |   |    |   |          |   |   |                |
|-----|---|----|---|----------|---|---|----------------|
| 87. | H | 49 | M | 4 weeks  | 8 | 3 | Fair (74)      |
| 88. | H | 22 | M | 36 weeks | 7 | 3 | Fair (73)      |
| 89. | H | 45 | M | 2 weeks  | 9 | 2 | Good (83)      |
| 90. | H | 50 | F | 2 weeks  | 9 | 2 | Good (82)      |
| 91. | H | 40 | F | 8 weeks  | 7 | 2 | Fair (77)      |
| 92. | H | 60 | M | 24 weeks | 7 | 2 | Fair (77)      |
| 93. | H | 25 | M | 6 week   | 9 | 1 | Excellent (96) |
| 94. | H | 56 | F | 8 weeks  | 7 | 2 | Good (86)      |
| 95. | H | 55 | F | 1 week   | 9 | 1 | Excellent (98) |
| 96. | H | 58 | F | 3 weeks  | 9 | 1 | Good (88)      |

**Table 7:** Summary of results

| Parameters                  | Hip         |
|-----------------------------|-------------|
| Total neglected cases       | 96          |
| Period of neglect mean±S.D  | 8.63 ±22.32 |
| Pre procedure VAS mean±S.D  | 8.30± 0.90  |
| Post procedure VAS mean±S.D | 1.56± 0.81  |
| Functional score mean       | 85          |
| Outcome mean                | Good        |

## V. Discussion

The result of our study has proven that neglected musculoskeletal injuries are a persisting epidemic in our country<sup>3</sup>. In our study neglected trochanteric fractures had a better outcome when compared to neglected neck of femur that underwent fixation of fractures. In neck of femur fracture that underwent prosthetic replacements had better outcome than fracture fixations of neglected neck of femur fractures. The three cases of neglected dislocations up to 6 weeks of neglect showed excellent to good outcomes. These results are consistent with previous studies of Garret et al<sup>4</sup> and Varma BP<sup>5</sup>. Garret et al and Oni et al<sup>6</sup> reported cases of traumatic unreduced posterior dislocation of hip with good results in separate studies

Some of the other studies like Gupta RC<sup>7</sup> et al conducted a study on 7 patients with old isolated posterior dislocation of hip with good to excellent results following gradual reduction of fractures with traction and limb abduction, the femoral head was reduced to reposition it into acetabulum. Adjuvant techniques like bone grafting were done by Kanna et al<sup>8</sup> where they studied 8 cases of nonunion trochanteric fractures with capsular interposition with cases having history of treatment by indigenous methods for 2 to 3 months. They were treated with open reduction and internal fixation with dynamic hip screw or dynamic condylar screw with bone grafting. Magu NK et al<sup>9</sup> studied 55 patients with average duration of neglect of 12 weeks where he treated them with Muller's modification of intertrochanteric osteotomy with good results. Newer techniques were studied by Lin et al<sup>10</sup> study on 20 patients with neglected neck of femur fracture for a period of 6-16 weeks for whom Dynamic hip screw with autogenous bone BMP-2 composite material grafting was performed. Another study for bone quality assessment as an additional prerequisite was explored by Kainthet al<sup>11</sup> study on 22 patients with more than 3 week old neglected neck of femur fracture, assessed their bone quality with Singh's index and treated them surgically with closed reduction and internal fixation. Other studies of Kim et al<sup>12</sup>, Kapoor et al<sup>13</sup> and Kalra et al<sup>14</sup> also deal with neglected hip trauma with good outcome in the patients.

In our study group we encountered wide spectrum of modes of native treatment as the most common cause for neglected hip trauma, the most common was the treatment under the name of "puthurkattu". The native treatment is found to be significantly prevalent in our part of the country. Out of the 80% of the study group who had opted for native treatment 41% belonged to rural areas and 39% belonged to urban areas. This marginal difference shows that in spite of the accessibility and wide availability of orthopedic specialty care centers the prevalence of native treatment induced complications is high in urban areas. This trend shows that there is ignorance and deep rooted false belief in the minds of our people irrespective of the area in which they reside. This has to be addressed first by health education and spreading awareness among the people. This marks the first step in the primordial prevention of neglected musculoskeletal injuries. In a few cases the reason was purely financial, where native treatment was a cheaper alternative.

Despite this we have given good results as outlined in the results section in most patients with varied duration of neglect and various causes of neglect. These many cases of neglected hip trauma that were collected

and studied have shown us that neglect of trauma is still widely prevalent. To our knowledge this study is unique in many ways as we have included a large population of a vast demographic coverage, increased sample size, various causes for neglect and finally long term follow up to ensure the complete success of our treatment methods.

## VI. Conclusion

In conclusion we have proven that irrespective of duration of neglect surgical procedures for neglected injuries are always better than watchful neglect. The complications and outcome in all the cases depended on many factors as even in some cases with longer neglect duration excellent outcome was possible but in some cases with shorter neglect duration also fair outcome was only possible. Hence the commonly found factors that can influence the outcome of the neglected musculoskeletal injuries in pre intervention stage were:

- Age of patient
- Type of native treatment availed
- Duration of native treatment methods
- Quality of native treatment methods
- Associated co morbidities
- Associated fractures

### **The Factors Which Influence The Outcome In Intervention And Post Intervention Stage Were:**

- Intra operative findings of soft tissue distortion and loss of anatomical configuration
- Type of procedure selected
- Aseptic precautions taken
- Patients' will for functional betterment
- Expertise of the surgeons
- Regularity in visiting the hospital for physiotherapy

In our study all the patients had a common will for betterment and they cooperated in all the steps and thereby had a successful outcome at the end of follow up. Hence patients' cooperation and perseverance is the foremost quality that defined success for them. As for the persisting epidemic of neglected musculoskeletal injuries we propose health educational programs and Government sponsored Health messages to spread the awareness of the benefits of immediate intervention and complications of neglect among both rural as well as urban population. We also propose setting up of tertiary care centers with dedicated orthopedic specialists in these centers to ensure neglect due to poor accessibility is prevented. We also laud the efforts of Tamil Nadu government in ensuring CMCHIS schemes is implemented to ensure equal treatment facilities for individuals of all social strata.

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