IS THERE A STANDARD WAY OF PERFORMING DYNAMIC HIP SCREW FIXATION?

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ABSTRACT
Objective: To find the way in which Dynamic Hip Screw (DHS) procedure was performed and to determine a standard common method.

Methodology: A questionnaire study was undertaken in all the three institutions involving all grades of orthopaedic surgeons performing DHS surgery. The questionnaire included questions related to all aspects of surgery from positioning of the patients to closure of skin and follow up. The questionnaire was distributed at all the institutions and also sent out by post.

Results: Five different systems, AO, Richards, Biomet, Zimmer and Stryker were used. 106(83.3%) questionnaires were returned out of the 120 distributed. 27 operations were carried out by consultants, 25 by middle grades, 42 by specialist registrars and 12 by senior house officers. In only 7(6.60%) the traction was released before putting on the plate, in 19(17.92%) operations power tap was used. A compression screw was used in 12(11.32%) operations. The muscle layer was sutured routinely in 41(38.67%) operations while in 65(61.32%) operations it was left unsutured. Wound drains were used in 84(79.24%). Skin closure was done with clips in 36(33.96%), with subcuticular sutures in 65(61.32%) and skin suturing in 4(3.77%) operations. Early postoperative mobilization with full weight bearing was allowed in 88(83.01%), partial weight bearing in 6(5.66%) patients.

Conclusion: Complete consensus could not be obtained from this study but the majority of surgeon used the surgical technique recommended by AO and Richard’s.

KEYWORDS: Hip fractures, DHS, Standard Method, and Elderly.

INTRODUCTION
Hip fractures management in the elderly by internal fixation and early mobilization is accepted generally. However, comminuted and unstable hip fractures still present difficulty despite improvement in fixation devices. As variety of sliding hip screw and plate devices has been introduced since 1950s, the DHS (Dynamic Hip Screw) has become a standard fixation method for extra-capsular hip fractures. The most important part of DHS operation is the insertion of hip screw in the femoral neck in an appropriate position. No previous literature related to the DHS exactly describe the entry point of hip screw. In this study, majority of surgeons while performing this very common procedure, the DHS fixation, followed the technique described by the AO and Richard’s.

METHODOLOGY
A questionnaire study was undertaken in all three institutions involving all grades of orthopaedic surgeons performing DHS surgery. The questionnaire was prepared after consulting colleagues performing the surgery and reviewing the literature issued by the various companies manufacturing the product. The questionnaire included questions related to all aspects of surgery from positioning of the patients to closure.
of skin and follow up. The questionnaire was distributed at the regional orthopaedic meetings of the three institutions and also sent out by post. A total of 120 questionnaires were distributed and 106 were returned.

RESULTS
Five different systems manufactured by AO, Richards, Biomet, Zimmer and Styker were used by the orthopaedic surgeons (Table-I). One hundred and six questionnaires were returned out of the 120 distributed a return rate of 88.3%. Out of the 106 operations 27(25.4%) were carried out by consultants (Con.), 25(23.4%) by Middle Grades (MD), 42(40%) by Specialist Registrars (SpRs) and 12(11.2%) by Senior House Officers (SHO). Of the 106 DHS operations, only in 7(6.60%) the traction was released before putting on the plate, in the rest of 99(93.39%) operations traction remained unreleased. In 19 (17.92%) operations power tap was used for cortical screws mainly by the consultants and SpR (Table-III). A compression screw was used in 12(11.32%) operation out of which 9 were left in and 3 removed after compression was achieved at the time of surgery. The muscle layer was sutured routinely in 41(38.67%) operations while in 65(61.32%) operations it was left unsutured. Wound drains were used in 84(79.24%) operations, out of this single drain was used in 72(85.71%), 2 drains in 12(14.28%) and no wound drain in 22(20.75%) operations. Skin closure was done with clips in 36(33.96%), with subcuticular sutures in 65(61.32%) and skin suturing in 4(3.77%) operations. Antibiotics were used in 104(98.11%) operations. Early postoperative mobilization with full weight bearing was allowed in 88 (83.01%), partial weight bearing in 6(5.66%) while the rest were left at the discretion of the physiotherapy department for mobilization and weight bearing. Detailed results with comparison of different grades are given in Table I-IV and Figures I-III.

DISCUSSION
Intertrochanteric fractures occur in elderly people with poor bone quality and most are comminuted and unstable. Since early mobilization is mandatory, the methods of fixation chosen must allow immediate weight-bearing. It has been shown that the quality of reduction and accurate implant position are one of the most important factors for fracture healing in fractures of the proximal femur. The recommended reduction would be anatomical for stable fractures and primary medialisation for unstable fractures. The recommended implant position is when the implant is within the central third of the head and neck on both AP and lateral views and that the tip of the implant is within 10 mm from the subchondral cortex of the femoral head. Poor implant position in the head and neck will cause mechanical failure and hence poor outcome of surgery. The incision line can be started one or two finger breadths below the tip of the greater trochanter. Our data showed that 66% surgeon start their incision 1 inch below the greater trochanter. Muscle splitting remains controversial, but our study has revealed that almost 69% surgeon prefer muscle splitting than cutting (Table-II).

A guide wire is either inserted approximately two fingers breadth below the greater trochanter or at level of lesser trochanter or both anatomical locations is used as a guide. In our study 62.4% surgeon use only greater trochanter as a landmark while 44.52% use both landmarks for passing the guide wire. The distance of the guide wire from the subchondral femoral cortex varies from 5 to 20 mm, our data suggest that 77% of surgeons use “10 mm” as the distance of guide wire from the cortex (Figure-I). Fluoroscopy was used to confirm satisfactory alignment of the guide wire, as judged on antero-posterior (AP) and lateral views. Guide wire orientation was checked both in AP or lateral views. Our data showed that middle one third in the lateral view and lower one third in the AP view, were the preferred orientation of the guide wire placement (Figure II, III).

Literature review reports that some authors have described reaming just up to the middle and others, all the way as far as length of the lag screw. Our study (69.81%) supported the later view. Tapping for the DH screw is not performed by 97% of surgeons included in this study (Table-III). Although various sizes of plates were available, the most commonly used was a 4 hole plate, McLaughlin however has reported that both 2 & 4 hole plates are biomechanically stable in treatment of intertrochanteric fractures. The recommendation from most companies is to fill the 2nd hole on the plate first, 65% followed this recommendation where as only 28% fixed the distal most screw first. Traction during the procedure is either maintained till the plate is fixed or released before plate fixation. Our study (99%) supported the later and maintained traction till plate fixation was complete. Eighty seven percent of surgeons did not use power tapping; while 94% did not routinely used a compression screw and sixty five percent of surgeons did not use layered closure. Drains were used by majority (85%) of surgeons, while 72% used one drain and 12% used two drains for haematoma prevention. In our study 65% of surgeon use subcuticular sutures for wound closure. Most surgeons use peri-operative antibiotic prophylaxis in patients undergoing DHS fixation, and most surgeons allowed immediate weight bearing postoperatively. Regular follow-up
was only instituted for younger patients. Most surgeons were of the view that DHS fixation alone stabilized the fracture, and fixation of the greater trochanter was not needed. Derotation screw was used by 77% of surgeon for basicervical fracture, supporting views of Dodd & Dencha.

CONCLUSION
Complete consensus could not be obtained from this study but the majority of surgeon used the following method for performing a very common procedure, DHS fixation. The most common systems used were that of AO and Richard’s, incision was started 1 inch below the greater trochanter and no muscle splitting was done. Guide wire entry point was two finger breadths below the vastus ridge and pass up to 10 mm from the cortex. Screw orientation on AP was in the lower 1/3 and in the middle 1/3 on the lateral view. Reaming up to the length of the lag screw size and inserted without tapping. A 4 hole plate was used for fixation and hole number 2 of the plate is fixed first. Associated greater trochanter fracture was ignored and de-rotation screws were used for basicervical fracture, medialization of the shaft was done if fracture was unstable. Traction was maintained till the plate was fixed. No power tapping was used, muscle layer closure was not required and drains were put in on a routine basis. Skin was closed with subcuticular stitches, perioperative antibiotic and full weight bearing was advised. We suggest that the above method be adopted for intertrochanteric fracture fixation with DHS, as a standard procedure as this is the method most commonly used, which can therefore a basis for further research and studies.

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Table-I: Systems Used

| System      | Number of operations | Percentage |
|-------------|----------------------|------------|
| AO          | 49                   | 46.22%     |
| Richards    | 49                   | 46.22%     |
| Biomet      | 4                    | 03.77%     |
| Zimmer      | 3                    | 02.83%     |
| Styker      | 1                    | 0.94%      |

Table-II: Incision

| Start of incision | Number of operations | Percentage |
|-------------------|----------------------|------------|
| At the tip of G.T. | 13                   | 12.26%     |
| 1” below the tip of G.T. | 66                | 62.26%     |
| 2” below the tip of G.T. | 26              | 24.58%     |
| Base of G.T.      | 01                   | 0.94%      |

Table-III: Results of Muscle Splitting, Length Of DHS & Tapping Of Lag Screw.

| Muscles Split in line of incision | No. of Patients / Percentage | Reaming Same length as DHS | No. of Patients / Percentage | Tapping Before DHS insertion | No. of Patients / Percentage |
|----------------------------------|-----------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|
| Con.                             | Yes                         | 10(9.4%)                  | Yes                         | 16(15.09%)                  | Yes                         | 5(4.71%)                   |
|                                  | No                          | 17(16%)                   | No                          | 11(10.37%)                  | No                          | 22(20.75%)                 |
| MG                               | Yes                         | 5(4.7%)                   | Yes                         | 22(20.75%)                  | No                          | 2(1.88%)                   |
|                                  | No                          | 20(18%)                   | No                          | 3(3083%)                    | No                          | 23(21.69%)                 |
| SpR                              | Yes                         | 17(16%)                   | Yes                         | 29(27.35%)                  | Yes                         | 2(1.88%)                   |
|                                  | No                          | 25(23%)                   | No                          | 13(12.26%)                  | No                          | 40(37.73%)                 |
| SHO                              | Yes                         | 5(4.7%)                   | Yes                         | 7(6.60%)                    | Yes                         | 0(0.00%)                   |
|                                  | No                          | 7(6.6%)                   | No                          | 5(4.71%)                    | No                          | 12(11.32%)                 |
| All                              | Yes                         | 37(34.9%)                 | Yes                         | 74(69.8%)                   | Yes                         | 9(8.4%)                    |
|                                  | No                          | 69(65.09%)                | No                          | 32(30.1%)                   | No                          | 97(91.5%)                  |

Table-IV: Plate Size Used

| Plate size | Number of operations | Percentage |
|------------|----------------------|------------|
| 2 Holes    | 0                    | 0%         |
| 3 Holes    | 2                    | 1.88%      |

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4 Holes | 102 | 96.22%
More   |   2 | 1.88%

**Figure-1:** Distance from Cortex

**Figure-II:** Orientation of the Screw (AP View)
Figure-III: Orientation of the Screw (Lat. View)