



## Original Article

# Treatment of displaced femoral neck fractures in young patients with DHS and its association to osteonecrosis<sup>☆</sup>

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## ARTICLE INFO

### Article history:

Received 17 October 2016

Accepted 17 January 2017

Available online xxx

### Keywords:

Femoral neck fractures/pathology

Femoral neck fractures/surgery

Bone screws

Young adult

## ABSTRACT

**Objective:** The purpose of this study is to evaluate the performance of dynamic hip screw for the treatment of dislocated femoral neck fractures in young patients, focusing on osteonecrosis.

**Methods:** A series of 53 patients with less than 55 years of age were retrospectively evaluated. All patients had dislocated femoral neck fractures (Garden III or IV) and were treated with DHS. Ficat's staging system was used to evaluate avascular necrosis.

**Results:** There were 38 (71.7%) males and 15 (28.3%) females, with an overall mean age at the onset of fracture of 41.9 years ( $\pm 12.8$ ). According to Garden's classification, 21 (39.6%) fractures were classified as type III and 32 (60.4%) were considered totally dislocated, Garden IV. Fracture healing was achieved in 39 patients (73.6%). Thirteen cases of avascular necrosis were observed (24.6%).

**Conclusions:** The incidence of avascular necrosis in young patients with a displaced femoral neck fractures treated with DHS was 24.6%. No statistically significant association was found between times elapsed to surgery, fracture displacement, and presence of derotation screw with osteonecrosis. Level of evidence IV.

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## Tratamento de fraturas deslocadas do colo femoral em pacientes jovens com DHS e associação com a osteonecrose

## RESUMO

### Palavras-chave:

Fraturas do colo femoral/patologia

Fraturas do colo femoral/cirurgia

**Objetivo:** O objetivo deste estudo foi avaliar o desempenho do *dynamic hip screw* (DHS) no tratamento de fraturas do colo femoral deslocadas em pacientes jovens, com foco na osteonecrose.

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<http://dx.doi.org/10.1016/j.rboe.2017.03.003>

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Parafusos ósseos  
Adulto jovem

**Métodos:** Uma série de 53 pacientes com menos de 55 anos de idade foram avaliados retrospectivamente. Todos os pacientes apresentaram fraturas do colo femoral deslocadas (Garden III ou IV) e foram tratados com DHS. O sistema de estadiamento de Ficat foi utilizado para avaliar a necrose avascular.

**Casística:** Foram incluídos 38 (71,7%) pacientes do sexo masculino e 15 (28,3%) do sexo feminino, com idade média no momento da fratura de 41,9 anos ( $\pm 12,8$ ). Segundo a classificação de Garden, 21 (39,6%) fraturas foram classificadas como tipo III e 32 (60,4%) foram consideradas totalmente deslocadas, Garden IV. A consolidação da fratura foi obtida em 39 pacientes (73,6%). Foram observados treze casos de necrose avascular (24,6%).

**Conclusões:** A incidência de necrose avascular em pacientes jovens com fraturas deslocadas do colo do fêmur tratados com DHS foi de 24,6%. Não houve associação estatisticamente significativa entre os intervalos até a cirurgia, o deslocamento da fratura e a presença de parafuso anti-rotacional com a osteonecrose. Nível de evidência IV.

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## Introduction

The vast majority of femoral neck fractures occur in the elderly patients after simple falls.<sup>1–6</sup> Today, we have sufficient evidences to support the routine use of hip replacement surgery in these patients.<sup>7–11</sup> However, for the young patients, it is necessary some preservation surgery to maintain the natural hip anatomy, its physiology and biomechanics, because they need high functional demands.

Anatomic reduction and stable internal fixation are essential in achieving the goals of treatment in young adult population with good bone quality. Until now, there is a debate on the best method of fixation for promoting union and preventing osteonecrosis of the femoral head. Many authors advocated two or three cannulated screws, and others for a more stable fixation using the dynamic hip screw, with anti-rotational screw or not.<sup>12–17</sup>

The purpose of this study is to evaluate the performance of dynamic hip for the treatment of dislocated femoral neck fractures in young patients (less than fifty five years), focusing in the worst complication: osteonecrosis.

## Methods

A series of 53 patients were retrospectively selected from the Hospital records. The inclusion criteria were less than 55 years old, and the patients should have a displaced femoral neck fracture (Garden III or IV) in the admittance to the hospital.<sup>18</sup> The exclusion criteria were less than 18 years or more than 55 years, Garden I or II femoral neck fractures, more than one week since the fracture event, comminuted fracture, associated head or acetabulum fracture, rheumatoid, arthritis, and metabolic diseases.

Patient's clinical conditions were evaluated using the ASA score.<sup>19</sup> All surgeries were performed with a standard fracture table and fluoroscopy assessment. Fractures were fixed with 135 degrees dynamic hip screws. An anatomic reduction was the goal to archive. Reduction was judged on both anterior posterior and lateral view.

**Table 1 – Demographics.**

Age (years $\pm$ SD)	41.9 $\pm$ 12.8 (18–55)
Sex	
Female	15 (28.3%)
Male	38 (71.7%)
Side	
Right	28 (54.3%)
Left	25 (45.7%)
Garden	
III	21 (39.6%)
IV	32 (60.4%)
TAD	9.62 $\pm$ 3.70
Anti rotational screws	
Yes	11 (20.8%)
No	42 (79.2%)
Time	
<72 h	30 (56.6%)
>72 h	23 (43.4%)

Avascular necrosis of the femoral head was diagnosed by clinical evaluation and x-rays alterations, as classic mottled appearance, increasing radio density, segmental collapse and degenerative changes. The Ficat's staging system was used to evaluate avascular necrosis.<sup>20</sup> The tip-apex distance (TAD) was measured as described by Baumgartner et al.<sup>21</sup>

## Casistic

There were 38 (71.7%) males and 15 (28.3%) females with an overall mean age at the onset of fracture of 41.9 years ( $\pm 12.8$ ). The youngest patient had 18 years old and the oldest 55 years old. The mean follow-up period was 2.6 years. The minimal follow-up time was 23 months.

Twenty-eight patients (54.3%) had the fractures on the right hip, and 25 (45.7%) on the left side. According to Garden's classification, 21 (39.6%) fractures were classified as type III and 32 (60.4%) were considered totally dislocated, Garden IV (Table 1).

Thirteen (24.5%) patients had associated injuries: three had knee ligament rupture, three had arm fractures, two ankle

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