



Original Article

Clinical evaluation of patients submitted to osteogenic distraction in the lower limb at a university hospital[☆]

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ABSTRACT

Objective: To evaluate the clinical characteristics from patients submitted to osteogenic distraction to correct bone gap at a university hospital.

Methods: Retrospective transversal study, with a convenience sample, from 2000 to 2012, evaluating clinical aspects of patients treated, submitted to osteogenic distraction (bone transport) with Ilizarov's external fixation device. The chi-squared, Fisher's, and Mann-Whitney's *U* tests were used with a 5% level of significance ($p < 0.05$).

Results: 33 patients were studied, of whom 28 men (84.8%). The more frequent age was from 21 to 40 years. Most patients were from the metropolitan region of the capital (57.6%). The leg was the most affected limb (75.8%), and the left side was the most affected (66.7%). The most common cause was infected pseudoarthrosis (75.8%). The most common bone transportation type was bifocal (75.8%). Mean previous surgery at others institutions were 2.62 (1.93 standard deviation), and mean surgeries after treatment were 1.89 (1.29 standard deviation). Ilizarov's external fixation device was used for 1.94 years (1.34 mean deviation), from one to six years. The most common complications were pin infection (57.6%), equinus (30.3%), deep infection (24.2%), and shortening (21.2%).

Conclusion: Osteogenic distraction for bone gaps were more frequent in young adults, men, in the leg, with bifocal transportation, after several previous surgeries, treated for a mean of two years, with many complications (infections were the most common).

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Avaliação clínica de pacientes submetidos à distração osteogênica no membro inferior em hospital universitário

RESUMO

Objetivo: Avaliar as características clínicas dos pacientes submetidos à distração osteogênica por falha óssea em hospital universitário.

Palavras-chave:

Pseudoartrose

[☆] Study conducted at the Department of Orthopedics and Traumatology, Hospital das Clínicas, Faculdade de Medicina, Universidade Federal de Goiás, Goiânia, GO, Brazil.

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Osteogênese por distração
Técnica de Ilizarov

Métodos: Estudo transversal, retrospectivo, com amostra de conveniência, de 2000 a 2012, das características clínicas de pacientes tratados e submetidos à distração osteogênica (transporte ósseo) com uso de fixador externo circular tipo Ilizarov. Foram usados os testes de qui-quadrado, exato de Fisher e U de Mann-Whitney, com nível de significância de 5% ($p < 0,05$).

Resultados: Foram 33 casos, 28 homens (84,8%). A idade mais frequente foi entre 21 e 40 anos. A maioria dos pacientes (57,6%) era da região metropolitana. O segmento mais afetado foi a perna (75,8%) e o lado foi o esquerdo (66,7%). A causa mais frequente foi a pseudoartrose infectada (75,8%). O tipo de transporte ósseo feito foi principalmente o bifocal (75,8% dos casos). A média de procedimentos prévios em outra instituição foi de 2,62 cirurgias (desvio padrão de 1,93) e a dos feitos após o início do tratamento foi de 1,89 cirurgia (desvio padrão de 1,29). O tempo de uso de fixador externo foi de 1,94 ano (desvio padrão de 1,34), com mínimo de um ano e máximo de seis. As quatro complicações mais encontradas foram infecção de base de pinos (57,6% dos casos), equino (30,3%), infecção profunda (24,2%) e encurtamento (21,2%).

Conclusão: A necessidade de distração osteogênica por falhas ósseas foi mais frequente em adultos jovens, homens, na perna, com transporte bifocal, após múltiplas cirurgias prévias, com média de aproximadamente dois anos de tratamento e com várias complicações (as infecções foram as principais).

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Introduction

Injuries to the appendicular skeleton due to high-energy trauma show a high prevalence of severe bone lesions, which can develop complications such as delayed union, pseudoarthrosis, infection, malunion, or bone gap. The challenge posed by the treatment of bone gaps has instigated researchers to find appropriate solutions for the different types of injury.¹

Among the main techniques used for diaphyseal bone loss reconstruction are the use of traditional bone graft, tibialization of the fibula, vascularized bone transposition, and bone transport (distraction osteogenesis).² The latter is divided into: (1) isolated shortening; (2) shortening followed immediately by stretching through distraction in the focus of pseudoarthrosis after a short compression period; (3) shortening followed by stretching away from the focus of pseudoarthrosis through corticotomy; and (4) progressive vertical segmental bone transport after corticotomy.

The first reports describing limb stretching were provided by Codvilla,³ in 1905, and the use of external fixator to produce bone lengthening began in 1913, with Ombredanne.⁴ However, this technique did not gain widespread acceptance until Ilizarov identified the mechanical and physiological factors governing bone regeneration during distraction osteogenesis. In 1969, Ilizarov and Ledyev⁵ were able to fill the bone defect and extend the limb after debridement of the infected bone and, at the same time, correct deformities. Their method was revolutionary by the standards of orthopedic treatments of the time.^{1,6,7}

Ilizarov recommended this technique for correcting bone defects secondary to congenital abnormalities, tumor resections, traumatic bone loss, or as a result of debridement in osteomyelitis with unviable bone tissue.^{8,9}

This study aimed to evaluate the clinical characteristics of patients undergoing distraction osteogenesis due to bone gap in a university hospital.

Methodology

This was a cross-sectional study, with a retrospective convenience sample, from 2000 to 2012, which included treated patients who underwent distraction osteogenesis (bone transport) using an Ilizarov circular external fixator. The present research was approved by the University Hospital Ethics Committee.

Data were collected from a review of medical charts and stored in an Excel 2007 spreadsheet. Statistical analysis was performed using SPSS for Windows, version 16.0. The chi-squared test, Fisher's exact test, and the Mann-Whitney U test were used to assess the influence of the variables on the types of complications, with a significance level of 5% ($p < 0.05$).

Review of medical charts retrieved 33 cases treated in this period using this method. The following data were collected: sex; age of patients at the beginning of treatment, a variable which was divided into age groups; area of origin; affected segment (tibia and/or femur); side; cause; type of bone transport performed (bifocal, or trifocal convergent or trifocal tandem bone transport); number of previous surgeries and number of surgeries after the treatment was instituted; time of external fixator use; and complications observed during treatment.

Complications were specified as: pin infections, deep infection, equinus, knee flexion, ROM limitation, axial deviation, re-fracture, amputation or disarticulation, shortening, impingement of the soft tissues, and any complication other than those mentioned. These were grouped into complications that did not require surgery for correction (Group 1),

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