

## Original article

## Pre-and postoperative functional status of patients subjected to anterior cruciate ligament reconstruction associated with knee dislocation

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**ABSTRACT.** *Introduction:* The injury of the cruciate ligaments secondary to knee dislocation is caused by high energy trauma; its incidence rate is less than 0.02%; there are multiple treatments, with surgery being the most common one. *Objective:* To determine the functional characteristics of patients who underwent cruciate ligament plasty and sustained knee dislocation. *Material and methods:* An observational, prospective, cross-sectional study was conducted including all adult patients with a diagnosis of cruciate ligament injury resulting from knee dislocation who were surgically treated from January 2006 to December 2007. Two knee functional assessment scales were used. *Results:* A total of 16 patients were included, 12 males and 4 females; mean age was 32.1 years. The Knee Society Clinical Rating Scale had a positive correlation with the Lysholm Knee Scoring Scale ( $r = 0.836$ ) with  $p = 0.001$ . *Discussion:* The functional results of patients treated surgically are diverse. This study was not conducted as a controlled clinical trial due to the absence of randomization, which was not possible due to the infrequency of the condition. *Conclusions:* It will be necessary to confirm the results after a longer follow-up and in a comparative, double-blind study of patients undergoing surgery.

**Key words:** reconstruction, knee, anterior cruciate ligament, dislocation.

**RESUMEN.** *Introducción:* La lesión de los ligamentos cruzados secundaria a luxación de rodilla es causada por traumas de alta energía, su incidencia es menor de 0.02%, existe una variedad de tratamientos el más común es el quirúrgico. *Objetivo:* Determinar las características funcionales de los pacientes sometidos a plastia de ligamentos cruzados que presentaron luxación de rodilla. *Material y métodos:* Se realizó un estudio observacional, prospectivo y transversal en todos los pacientes con diagnóstico de lesión de ligamentos cruzados en edad adulta tratados quirúrgicamente en el período de Enero 2006 a Diciembre 2007 provocados por luxación de rodilla. Aplicándose dos escalas de valoración funcional de rodilla. *Resultados:* Se incluyeron 16 pacientes, 12 hombres y 4 mujeres con promedio de edad de 32.1 años, la valoración clínica de la Escala de la Sociedad de Rodilla presenta una correlación positiva con la escala de Lysholm ( $r = 0.836$ ) con una  $p = 0.001$ . *Discusión:* Existe diversidad en los resultados funcionales de pacientes operados; el estudio no puede llevarse a cabo como ensayo clínico controlado por la falta en la aleatorización por ser una patología no frecuente. *Conclusiones:* Será necesario ratificar los resultados a un seguimiento más prolongado y bajo un estudio comparativo a valoración doble ciego de pacientes sometidos a cirugía.

**Palabras clave:** reconstrucción, rodilla, ligamento cruzado anterior, dislocación.

### Level of evidence: IV (Act Ortop Mex, 2010)

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## Introduction

Knee injuries in which there is anterior cruciate ligament tear combined with injury of the posterior cruciate ligament represent a rare entity among the usual conditions.

A study aimed at assessing patients with this condition is essential at a referral hospital, as there are no previous studies of this condition because it is considered as rare among traumatic disorders. Patients undergoing anterior and posterior cruciate ligament plasty who have knee dislocation are considered as surgical patients, and this is why it was decided to conduct this study. Traumatic knee dislocation is an entity caused by high energy traumas; however, its incidence is very low and, according to *Rihn*,<sup>1</sup> it represents less than 0.02% of all orthopedic emergencies (*Figure 1*).<sup>1,2</sup> A wide variety of methods have been used to treat this condition; many of them began with conservative treatment, which for a long time was the treatment of choice many years back. As a result of the great breakthroughs in the field of medical sciences, the increasing development of diagnostics and perfecting of surgical techniques, there is a new approach that significantly improves the outcomes and the quality of life of patients.<sup>3</sup> The incidence rate of this entity is extremely low. At the Mayo Clinic there were more than 2 million admissions in a 50-year period and only 14 patients had this entity. Most important in this entity is the precise detection of the presence or absence of a vascular injury. There are two very useful imaging methods, such as Doppler, which is easy to use in the Emergency Room, and angiography. Another fundamental aspect of the diagnosis is the presence of associated injuries that include the following major ones: neurologic damage, fractures, and ligament injuries.<sup>4,5</sup>

There is controversy as to which is the optimum treatment after reduction of knee dislocation. Surgical repair offers better results than conservative management.<sup>6,7</sup>

Several methods for the reconstruction of ligament injuries have been proposed; they are performed at either one or two stages, as reported by Fanelli (*Figure 2*).<sup>8,9</sup>

We proposed as our main objective to assess the function of patients undergoing anterior and posterior cruciate ligament plasty resulting from knee dislocation, using validated scales.

## Material and methods

A case-review type of study was conducted: observational, prospective and cross-sectional, from January, 2006 to December, 2007. Once they signed the informed consent, adult patients of both genders, ages 18 to 60 years, beneficiaries of the Mexican Social Security Institute, were enrolled. They all had a clinical, radiographic and MRI diagnosis of anterior and posterior cruciate ligament injury resulting from a high energy mechanism that caused knee dislocation. Patients with knee fracture, prior osteosynthesis or postoperative infection were excluded. An assessment of knee flexion, extension and pain was carried out using the Lysholm and IKDC validated scales. Descriptive statistics were used for the means and proportions, and the chi<sup>2</sup>-test to prove the hypotheses. This study complied with the standards established by the Ministry of Health and the Mexican Social Security Institute.

## Results

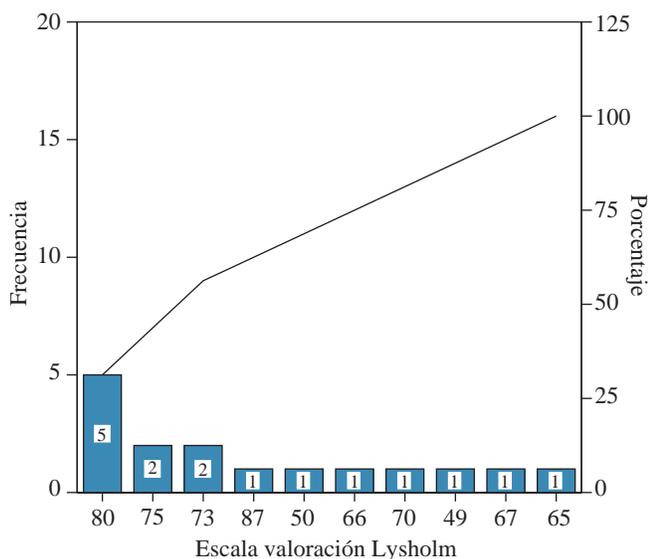
A total of 16 patients were assessed, mean age was 32.19 ± 11.57 years; there were 12 males and 4 females; size was 1.68 ± 8.8 and weight 83 ± 14.37; the right knee was the most frequently affected one accounting for 56.3%, the left knee 37.5%, and 6.3% had bilateral involvement. The etiology of dislocation was: motor vehicle trauma (37.5%); sports trauma (18.8%), falls from a height (25%), and motor vehicle accident (18.8%). Associated injuries were as follows: medial meniscus tear (14%); lateral meniscus (7%); medial collateral ligament (25%), and lateral collateral ligament (37.5%). One patient had vascular and nerve injury. The Lysholm scale mean score was 71.88 (*Chart 1*), the IKDC score was 75.63 (*Chart 2*). Mean follow-up was 27 months. An autologous bone-tendon-bone (BTB) and semitendinosus-gracilis (ST/G) graft was used in 75% of the patients; a con-



**Figure 1.** Anteroposterior (A) and lateral (B) views showing a dislocated knee.



**Figure 2.** Final X-rays of a patient who underwent surgery for cruciate ligaments and lateral collateral ligament injuries. Anteroposterior (A) and lateral (B) views.

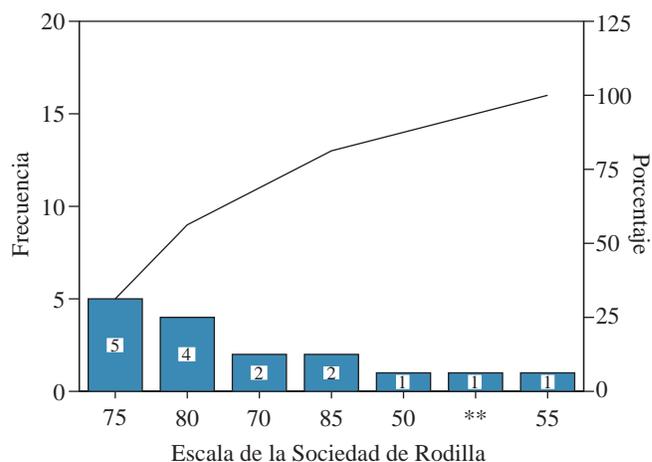


**Chart 1.** Functional assessment using the Lysholm scale.

tralateral knee graft was used in 4 (25%). The IKDC clinical assessment scale showed a positive correlation with the Lysholm scale ( $r = 0.836$ ) with a  $p = 0.001$  (Chart 3).

### Discussion

The injury of both cruciate ligaments is an event that results from high energy injuries. According to the literature it represents less than 0.02% of orthopedic emergencies.<sup>1,3</sup> The statistical data on its incidence and prevalence are not well defined and those included in the literature are not clear enough. Some studies reveal that 50% of injuries are reduced at the accident site through maneuvers during the transportation of the victim and are missed.<sup>4,6</sup> In our series MVAs were the most common cause of these injuries and



**Chart 2.** Functional assessment using the IKDC scale.

they occurred at a rate comparable with what other studies have reported (37.5%). There are previous studies in which a higher frequency of these conditions is reported in males, as described in our study, with 75%.<sup>7</sup> The mean age at the time of the injury was 32 years, comparable to what other case series have reported. In our study the time elapsed between the injury and the surgical management was a mean of 6 weeks. Some studies do not recommend performing surgery before 3 weeks, as more complications have been observed in such cases, including arthrofibrosis.<sup>8</sup> The mean follow-up period reported is 24 to 48 months; the mean follow-up in our series was 27 months.<sup>9,10</sup> Some reports mention patients who underwent conservative management whose functional parameters were inferior than those in patients who underwent surgical management.<sup>10</sup> Some reports state that 75% of the patients assessed had associated injuries of the menisci and collateral ligaments. In our series this figure is well below this percentage.<sup>11</sup> The arteriovenous injuries

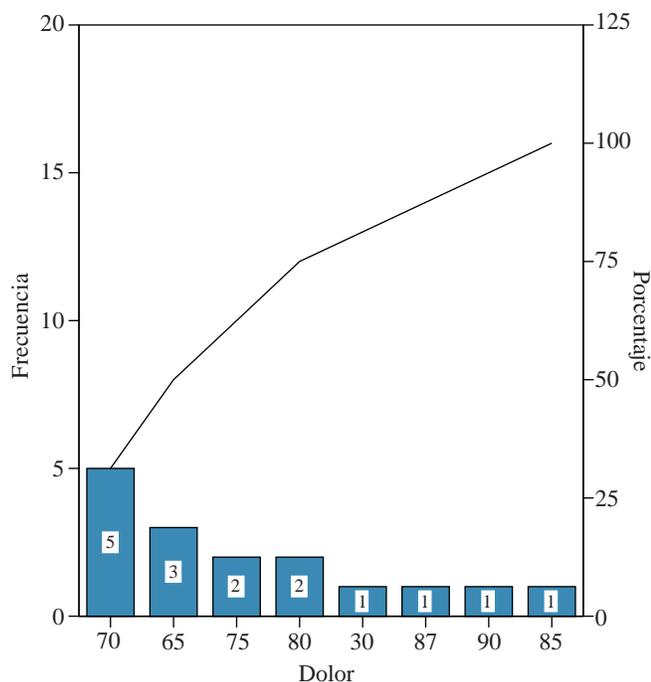


Chart 3. Pain scale.

previously described may occur in up to 25%; in this series they occurred in 12.5%.<sup>12</sup> We believe that the diversity in the functional results is due to several factors: use of various grafts (bone-tendon-bone, semitendinous and gracilis tendons); use of different techniques for graft fixation; the low frequency of these injuries, and the difficulty in having long follow-up periods.

### Conclusions

The two-stage reconstruction of anterior and posterior cruciate ligaments shows a trend towards restoring an ac-

ceptable functionality from the standpoint of resuming activities, reflected in the functional outcomes of the measurement scales applied. It will be necessary to confirm the results after a longer follow-up and in a comparative, double-blind study of the patients who underwent this surgery.

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