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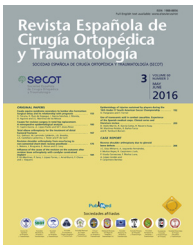

ORIGINAL ARTICLE

Z-Elongation of the transverse carpal ligament vs. complete resection for the treatment of carpal tunnel syndrome☆

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KEYWORDS
Transverse carpal ligament;
Carpal tunnel syndrome;
Pillar pain;
Grip strength

Abstract
Background: Carpal tunnel syndrome is treated successfully by surgical release of the transverse carpal ligament (TCL). However, persistent weakness of grip and pain over the thenar and hypothenar ends of this ligament, and ''pillar pain'', are reported to be common complications. In order to reduce these complications, different ligament reconstruction or lengthening techniques have been proposed.
Objective: The purpose of this study is compare effectiveness and complications of TCL z-lengthening technique with complete TCL section.
Methods: A prospective, randomised, intervention trial was conducted on 80 patients. The patients were divided into 2 groups: (1) complete release of TCL; (2) z-lengthening of TCL according to a modified Simonetta technique.

Grip strength, pillar pain and clinical and functional assessment were carried out using the Levine et al. questionnaire.
Results: No significant differences were observed ($P > .05$) in the postoperative reviews between the two groups as regards grip strength loss and pillar pain. There were significant differences between preoperative and postoperative mean Levine scores, but there was no difference in the mean scores of the two procedures at any time.

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Discussion: In conclusion, according to the results, TCL z-lengthening is more effective than simple division, but there is no identifiable benefit in z-lengthening for avoiding complications.

PALABRAS CLAVE
Ligamentum carpi transversum;
Síndrome del túnel del carpo;
Pillar pain;
Fuerza de prensión

Elongación en Z del *ligamentum carpi transversum* vs. apertura completa para el tratamiento del síndrome del túnel del carpo

Resumen
Introdución: La apertura completa del ligamentum carpi transversum (LCT) es el tratamiento de elección para el síndrome del túnel carpiano. Sin embargo, la pérdida de fuerza de prensión y el dolor sobre la eminencia tenar e hipotenar, denominado «pillar pain» son complicaciones comunes asociadas a dicha técnica. Se han descrito técnicas que reconstruyen dicho ligamento o lo elongan para disminuir estas complicaciones.
Objetivo: Analizar la efectividad de la elongación en Z del LCT y la disminución de dichas complicaciones comparándolo con la apertura completa del LCT.
Material y método: Se realiza un estudio de intervención prospectivo aleatorizado de 80 pacientes. Los pacientes fueron divididos en 2 grupos: 1) apertura completa de LCT; 2) elongación en Z según técnica modificada de Simonetta.
Se analiza la fuerza de agarre, presencia de pillar pain y valoración clínica y funcional mediante el cuestionario Levine.
Resultados: No hay diferencias estadísticamente significativas ($p > 0,05$) en la pérdida de fuerza de agarre y presencia de pillar pain entre ambas técnicas en las revisiones realizadas a los 15 días, un mes, 3 meses y un año posquirúrgico. Sí hay diferencias estadísticamente significativas entre los datos preoperatorios y postoperatorios sin embargo, no hay diferencias estadísticamente significativas en el cuestionario de Levine entre ambas técnicas.
Discusión: La elongación en Z del LCT es una técnica igual de efectiva que la apertura completa para el tratamiento del síndrome del túnel carpiano pero sin ofrecer ventajas en cuanto a la disminución de fuerza, presencia de pillar pain o mejoría de los resultados funcionales.

Introduction

Complete resection of the ligamentum carpi transversum (LCT) is the treatment of choice for carpal tunnel syndrome (CTS). Nevertheless, loss of grasping strength and pain on the thenar and hypothenar known as ''pillar pain'' are common complications associated with this technique, and they may last from 3 months to several years.[1,2]

The majority of authors attribute this loss of grasping strength to the disappearance of the pulley effect of the LCT on the flexor tendons.[3] The exact aetiology of this pain around the incision at the level of the eminences (''pillar pain'') is unclear. One hypothesis is that it may be secondary to an alteration in the structure of the carpal arch[4] due to an oedema of the superficial tissues of the LCT, caused by injury to the cutaneous branches of the palm[5] or relaxation of the thenar and hypothenar eminence muscles following the resection of the said ligament.[6] This complication delays the return to everyday activities and work, and it may cause emotional anxiety, all of which lead to an increase in healthcare costs.[7]

Several techniques have been suggested to resolve the problem arising from the resection of an important flexor tendon pulley such as the LCT.[3,8] These include its reconstruction after complete severance,[9–12] as well as other techniques which simply lengthen it without completely cutting it, including the one described by Simonetta.[13] Additionally, these techniques aim to prevent ''pillar pain'', based on the hypothesis that this is caused by a combination of ligament disruption and exposed nerve endings together with biomechanical alteration of the carpal tunnel due to the loss of the biomechanical and neuroprotector qualities of the retinaculum flexorum.[9]

The aim of this work is to analyse the efficacy of Z-elongation of the TCL (reduction of pain and paresthesthia within the territory of the median nerve) and to evaluate the possible reduction in complications (loss of strength and ''pillar pain''), comparing it with the complete resection of the said ligament to treat CTS.

Material and method

Study design

A randomised prospective study was performed. The study sample is composed of 80 active patients (11 men and 69 women) under the age of 65 years old. The patients were