



Clinical Study

Radiological evaluation of hallux valgus after application of Mini TightRope: Short-term results

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المخلص

هدف البحث: يعد إبهام القدم الأرواح أكثر التشوهات شيوعاً لإبهام القدم ويوجد عدد كبير من الجراحات التقليدية المعنية بذلك، والمشتملة على قص العظم، ومع تعدد هذا النوع من الجراحات وشدته فإنه لم يثبت تفوق أي منها. ويبدو جهاز "الحبل الصغير المشدود" أحد الخيارات الجراحية الخفيفة التي لا تحتاج إلى قص العظم هذا البحث يدرس قدرة جهاز "الحبل الصغير المشدود" على تقليص الزاوية مابين المشطين وكذلك زاوية الإبهام الأرواح في الحالات ذات الدرجة الخفيفة والمتوسطة لإبهام القدم الأرواح.

طرق البحث: خضع أربعة مرضى لعملية تركيب جهاز "الحبل الصغير المشدود" وكان متوسط أعمارهم 30.5 عاماً وقد تمت معاينتهم قبل وبعد العملية واستمرت متابعتهم لمدة عام، وكان احتساب مقدار التعديل بناء على الزاوية بين المشطين وزاوية الإبهام الأرواح وكذلك وضع العظام السمسمانية تحت المشط الأول.

النتائج: انخفضت قيمة الزاوية بين المشطين من 15.75 درجة، إلى 4.5 درجة باستخدام جهاز "الحبل الصغير المشدود"، ومتوسط زاوية الإبهام الأرواح من

31.25 درجة إلى 5.75 درجة.

الاستنتاجات: بالمقارنة مع عمليات القص العظمي فإن عملية جهاز الحبل الصغير المشدود تعد خياراً جراحياً أخف وأبسط وقادراً على تقليص الزاوية بين المشطين وزاوية الإبهام الأرواح بشكل جيد في الحالات ذات الدرجة الخفيفة والمتوسطة لإبهام القدم الأرواح. ولقلة عدد الحالات وقصر مدة المتابعة فإن الدراسة تقترح دراسة عدد أكبر ومدة أطول للمتابعة.

الكلمات المفتاحية: وكعة؛ جهيضة زرية؛ إبهام القدم الأرواح؛ فحج المشط الأول؛ الحبل الصغير المشدود

Abstract

Objectives Hallux valgus is the most common deformity of the great toe. Many traditional forms of osteotomy are available, but none has proven to be superior, despite their aggressiveness. The Mini TightRope® (Arthrex Inc.) procedure

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appears to be a less invasive alternative, and the objective of the present study was to test the hypothesis that the procedure is an effective surgical option for reducing the intermetatarsal angle (IMA) and hallux valgus angle (HVA) in cases of hallux valgus of mild-to-moderate severity.

Methods: Four patients (four feet) with hallux valgus underwent the Mini TightRope procedure. All the patients were women, and their mean age was 30.5 years. All patients were reviewed before and after the procedure, with an average post-operative follow-up of 1 year. The IMA, HVA and sesamoid bone position were the radiological indicators of correction.

Results: In the four operated patients, the mean IMA decreased from 15.75° to 4.5° and the mean HVA from 31.25° to 5.75° .

Conclusion: The Mini TightRope procedure is a simpler, more effective, less invasive surgical option than other procedures and seems to correct IMA and HVA satisfactorily in cases of hallux valgus of mild-to-moderate severity. In view of the small number of cases and short follow-up, further studies with more cases and longer follow-up are needed.

Keywords: Bunion; Button device; Hallux valgus; Metatarsus primus varus; Mini TightRope

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Introduction

Hallux valgus is not simply a lateral deviation of the great toe, as the name implies, but is a complex deformity consisting of a medial shift of the first metatarsal and lateral deviation of the hallux, with elements of malrotation (usually pronation) as well as a bunion formation on the medial aspect of the first metatarsal head.¹ Comprehensive understanding of the mechanism by which the deformity develops is essential for successful correction. Females are more frequently affected than males,² and there is a strong association between wearing high-heeled, tight shoes and hallux valgus formation.^{1,2} Many hypotheses have been proposed for its pathogenesis, including structural abnormalities, genetic predisposition, muscle imbalance and ligamentous hyperlaxity.³

Although the pathophysiology of hallux valgus is not yet fully understood, many authors consider that medial deviation of the first metatarsal is the primary deformity, while lateral deviation of the hallux is secondary. As a result, the normal anatomical relationship and biomechanics are distorted. The adductor hallucis, through its insertion at the base of the proximal phalanx, works as a deforming force, facilitating further progression of the deformity. As the deformity progresses, the lateral capsule of the metatarsophalangeal joint is contracted, whereas the medial capsule is attenuated.⁴

More than 130 corrective procedures for the treatment of hallux valgus have been described in the literature.⁵ The aim of all these surgical interventions is to achieve adequate correction with less invasive methods and fewer complications;

however, it appears that none of these procedures satisfactorily fulfils these criteria.⁶

The treatment outcomes for hallux valgus depend on optimal restoration of the anatomical relationship. The goal of the recently introduced Mini TightRope procedure (Arthrex Inc.,



Figure 1: Preoperative dorsoplantar X-ray of weight-bearing feet, showing an increased intermetatarsal angle and hallux valgus angle, as well as medial subluxation of the sesamoid bones.



Figure 2: (A) Postoperative weight-bearing dorsoplantar X-ray showing marked reduction in the intermetatarsal angle and hallux valgus angle. Sesamoid bones are visible in their normal location. (B) Postoperative X-ray showing proper placement of the Mini TightRope device in the first and second metatarsals.

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