

Original article

Trapeziometacarpal arthrodesis: Overall functional hand assessment

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ABSTRACT. Trapeziometacarpal arthrosis is a degenerative condition described by Fostier in 1937. Osteoarthritis of the trapeziometacarpal joint is a common condition among postmenopausal women; mean age of individuals affected by this disease is 64 years. The male:female ratio is 1:10; 33% of patients have a bilateral component. This study was conducted at Lomas Verdes Traumatology and Orthopedics UMAE hospital, hand surgery module, between March and December 2006. Descriptive, cross-sectional, retrospective study including a total of 18 patients, 12 females (66.6%) and 6 males (33.3%). Mean age is 49.3 years. Patients were clinically and radiographically diagnosed and classified by stages according to the Eaton classification. Surgery was performed more frequently in right hands, which were a total of 10 (55.6%), than left hands, which were 8 (44.4%). Surgery of the dominant hand was performed in 8 patients, 7 of them right handed, and one left handed. Arthrodesis with nails was performed in 12 patients (66.7%) and with a 2.0 condylar plate in 6 (33.3%). Mean operative time was 52.8 minutes. Eleven patients were found to have primary arthrosis, and 7 had posttraumatic arthrosis: 2 due to untreated Bennett fractures, one due to a healed trapezius fracture and 4 patients had recurrent dislocation. As regards their occupation, 12 were employees, 5 were housewives and one was unemployed. The concomitant conditions found included: 9 without disease, 7 with hypertension, 7 diabetes mellitus, and one had rheumatoid ar-

RESUMEN. La artrosis trapeziometacarpiana es un padecimiento degenerativo descrito por Fostier en 1937. La osteoartritis de la articulación trapeziometacarpiana es una condición común de las mujeres postmenopáusicas, la prevalencia de este padecimiento es a los 64 años en promedio. La proporción hombre-mujer es de 1:10. Treinta y tres por ciento tiene componente bilateral. El presente estudio se realizó en la UMAE Hospital de Traumatología y Ortopedia Lomas Verdes, en el Módulo de Cirugía de la Mano, en el período comprendido de Marzo a Diciembre 2006. Es un estudio descriptivo, transversal, retrospectivo, se estudiaron en total 18 pacientes, distribuidos en 12 pacientes mujeres (66.6%) y 6 hombres (33.3%). Con edad promedio de 49.3 años. Fueron diagnosticados clínica y radiográficamente y clasificados por estadios según la clasificación de Eaton. La mano derecha se presenta en más cirugías con 10 (55.6%) e izquierda de 8 (44.4%); la mano dominante se operó en 8 pacientes, 7 derechos y 1 izquierdo; se realizó artrodesis con clavillos en 12 pacientes (66.7%) y con una placa condilar 2.0 en 6 pacientes (33.3%) y el tiempo de cirugía promedio fue 52.8 minutos. Se encontraron 11 pacientes con artrosis primaria y 7 pacientes con artrosis posttraumática: 2 por fracturas de Bennett no tratadas 1 por fractura consolidada del trapecio, 4 pacientes presentaron luxación recurrentes. La ocupación registrada fue 12 empleados, 5 amas de casa, 1 desempleado; de las enfermedades asociadas se encontró: 9 sin enfermedades, 7 con hipertensión,

Level of evidence: IV (Act Ortop Mex, 2011)

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thrititis. Two patients were reoperated (11.1%) due to pseudoarthrosis. In one of them a new arthrodesis was performed 18 months later, which failed and 8 months later triscaphoid arthrodesis was performed with a 10-week healing time. Trapeziometacarpal arthrodesis is a procedure involving a certain difficulty due to the anatomic conformation of the joint, which results in the various complications that have already been described. It provides pain relief; it is a good option for people who need to resume a type of work requiring the use of force; a longer follow-up is required to determine the course of these patients.

Key words: arthrodesis, hand, utility, carpometacarpal, joint.

7 con diabetes mellitus y uno con artritis reumatoide. Dos pacientes fueron reintervenidos (11.1%) debido a pseudoartrosis, en uno de ellos 18 meses después se realiza una nueva artrodesis resultando fallida y 8 meses después se realizó artrodesis triscafoidea con un tiempo de consolidación de 10 semanas en el último paciente. La artrodesis trapeziometacarpiana es un procedimiento con grado de dificultad por la conformación anatómica de la articulación, lo cual se presenta en las diversas complicaciones ya descritas, nos ofrece una mejoría del dolor, la integración oportuna del trabajo donde requiere fuerza es una opción de tratamiento, se requiere un seguimiento más largo para ver la evolución de estos paciente.

Palabras clave: artrodesis, mano, utilidad, carpometacarpiana, articulación.

Introduction

The thumb performs 40% of hand function; the trapeziometacarpal joint has a saddle configuration; the disposition of its ligaments and motor apparatus, its orientation in space, and most of its longitudinal rotation allow for the rotation of the two perpendicular axes. This disposition permits the formation of a pincer between the thumb and the long fingers and the formation of a grip; the joint has a complex anatomy as it is stabilized by the capsule, the intercapsular ligaments and the tendon force around them.^{1,2}

Trapeziometacarpal (TMC) joint arthrosis was described by Forestier in 1937. It is characterized by abrasion, progressive deterioration of joint surfaces and bone neoformation. It may result from alterations due to a local disorder affecting joint tissue, like a decrease in the latter, and occurs as a primary pathologic process. Trapeziometacarpal joint osteoarthritis is a common condition affecting 16-25% of postmenopausal patients; the radiologic prevalence of the disease in this population group shows a mean age of 64 years in 80-90% and it is usually bilateral. Thirty-three percent of cases present with pain at the base of the thumb, which is more severe in the dominant side. The incidence rates of arthrosis show that it is less frequent in males, with a male:female ratio of 1:10. It is usually diagnosed around age 50. It occurs in 85% of females this age,^{2,3-5} and presents as edema, thumb pain, instability, deformity and decreased mobility, or as a result of preexisting joint lesions (trauma, mechanic disorders, infectious arthritis, etcetera).^{2,6}

Material and methods

A cross-sectional, retrospective and descriptive study was conducted at IMSS «Lomas Verdes» Orthopedics and

Traumatology Hospital Hand Surgery Service. Patients enrolled included those with a diagnosis of trapeziometacarpal arthrosis who underwent trapeziometacarpal arthrodesis surgery with Kirschner nails or a 2.0 condylar plate between March 2006 and December 2006. Initial data were collected from the programming notebooks and clinical files of the Hand Surgery Service. Male and female patients were included regardless of age or occupation. Those who had already undergone hand surgery, who did not have a complete clinical record, who did not wish to participate in the study or who were not located were excluded.

The following data were collected: sex, age, occupation, operated hand, dominant hand, implant used, associated conditions, date of surgery, ischemia time and discharge date. Patients were contacted via telephone and appointments were made for the visits for assessments and application of the DASH (Disabilities of the Arm, Shoulder and Hand), which measures the quantitative dysfunction of the thoracic limb.

Results

A total of 18 patients were operated at the service; 12 females (66.6%) and 6 males (33.3%); mean age was 49.3, with a range of 22-75 years. More surgeries were performed in the right hand, 10 (55.6%), than in the left hand, 8 (44.4%). The dominant hand was operated in 8 patients: 7 right and one left hand. Arthrodesis was performed with nails in 12 patients (66.7%) and with a 2.0 condylar plate in 6 (33.3%); the mean operative time was 52.8 minutes. Eleven patients were found to have primary arthrosis, and 7 had posttraumatic arthrosis: 2 due to untreated Bennett fractures, one due to a healed trapezius fracture, and 4 patients had recurrent dislocation. The recorded occupations

were: 12 employees, 5 housewives, and one unemployed. The concomitant conditions found included: 9 with no disease, 7 had hypertension, 7 diabetes mellitus, and one had rheumatoid arthritis. Two patients were reoperated (11.1%) due to pseudoarthrosis. In one of them a new arthrodesis performed 18 months later failed, and 8 months later a triscaphoid arthrodesis was performed with a healing time of ten weeks for the latter procedure. The other patient had a history of trauma and required a partial thickness graft due to skin loss and stabilization with nails due to delayed healing. At present one patient continues to have postoperative pain and is under observation at the service; one patient has hypoesthesia at the incision area (5%), and one patient has poor anteposition of the metacarpal, which limits pressure. The mean DASH score was 16.19, with a minimum of 8.65 and a maximum of 27.88 percent points. According to patient perception, the degree of satisfaction with surgery was as follows: 13 patients, good (72.2%); and 5 patients, fair (27.8%). Healing time was 9.5 weeks (*Figures 1 and 2*).

Discussion

According to the above mentioned literature, trapeziometacarpal arthrodesis is recommended in young patients; it provides pain relief, stability and durability,⁴ due to the high demand of the limb; it is also indicated for traumatic disorders. Forseth⁷ reported an 11% delayed healing rate and an 8% pseudoarthrosis rate. In this type of procedure, Fulton⁴ reported 7% of pseudoarthrosis; Hartigan,⁶ 16%. Our study reports 11.1%, which coincides with the above mentioned. This is the most common complication of failed arthrodesis.² Nerve lesions reported in the literature represent 8%, our study reported 5%. No common infections were reported in the study, only superficial infections, which were treated with oral antibiotics. The ones reported do not interfere neither with the arthrodesis nor with the procedure per-

formed. Only one patient had pain (5%). The previous study by Forseth⁴ reported 8% for plate fixation and 2% for nail fixation. It is currently considered that pain is a complication of this type of procedures, mainly in patients older than 60 years.⁸ The degree of satisfaction reported in the literature is as follows: 79% were very satisfied, and satisfaction was 19%, with 74% excellent results, 16% good, and 10% fair, according to Hobby.⁹ In a study on metacarpal osteotomy, the literature reports pain relief in 90% of cases, same as what was reported in a comparison made with ligament reconstruction and tendon interposition by Hartigan.⁶ The latter himself subjectively assessed hand function with tests like lifting a gallon, turning a key, buttoning, opening a container, opening the car door and turning the door knob as the only test to assess the function of operated hands. The result



Figure 1. Female, 59 year-old patient with trapeziometacarpal arthrosis, scaphoid pseudoarthrosis, with resection of the distal pole.



Figure 2. Male, 40 year-old patient with trapeziometacarpal arthrosis secondary to a relapsing dislocation.

was difficulty only in opening a container. In our study the DASH score assesses the above mentioned functions, besides others involving daily life activities, hand strength and pain. Reports of previous studies on this procedure show minimum function changes.¹⁰⁻¹⁸

Conclusion

Trapeziometacarpal arthrodesis is a procedure with a certain degree of difficulty due to the anatomical conformation of the joint, which results in the above mentioned complications. It provides pain relief, and timely return to work when strength is required; it is a treatment option and a longer follow-up is required to determine how these patients do.

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