

Original article

# Treatment of trapeziometacarpal osteoarthritis by partial trapeziectomy and costal cartilage autograft. A review of 100 cases

## *Traitement de la rhizarthrose par trapézectomie partielle et autogreffe de cartilage costal. À propos de 100 cas*

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### Abstract

**Purpose.** – Trapeziectomy remains the surgery of choice in the treatment of trapeziometacarpal osteoarthritis. Some authors consider the collapse of the trapezoidal space responsible for a loss of strength and intracarpal deformities. We report our experience of partial trapeziectomy with chondrocostal autograft as an interposition material.

**Methods.** – The study included 100 thumbs in 82 patients with a mean age of 64.6 years (47–82). Mean follow-up was 68 months (4–159). Partial trapeziectomy was carried out through a dorsal approach. The graft was harvested through a direct approach of the 9th rib.

**Results.** – Our results were similar to those obtained with alternative techniques, except for strength where the gain is improved. No intracarpal deformities were seen. There was no sign of graft wear; the length of the thumb ray is preserved. The results are stable over time, and the morbidity of the costal donor site is negligible. The interposition of a hardwearing biological material and its association with partial trapeziectomy enable to restore the thumb stability and strength.

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**Keywords:** Osteoarthritis of the trapeziometacarpal joint; Partial trapeziectomy; Chondrocostal autograft

### Résumé

**Introduction.** – La trapézectomie totale reste le traitement chirurgical de choix dans le traitement de la rhizarthrose. Des auteurs considèrent que le collapsus de la colonne du pouce engendré par cette technique est responsable d'une perte de force et de déformations dégénératives intracarpiennes. Nous rapportons dans cette étude notre expérience de la trapézectomie partielle avec interposition d'une autogreffe de cartilage costal.

**Méthode.** – La série comporte 100 pouces chez 82 patients d'âge moyen 65 ans (47–82) avec un recul moyen de 68 mois (4–159). La trapézectomie partielle était réalisée par une voie d'abord dorsale. La greffe était prélevée par abord direct de la neuvième côte.

**Résultats.** – Les résultats cliniques obtenus sont similaires aux techniques alternatives de la littérature, sauf pour la force où le gain semble supérieur. Aucune déformation intracarpienne n'a été observée, ni d'usure de la greffe et la hauteur de la colonne du pouce est préservée. La morbidité du site donneur est nulle et le résultat clinique est stable dans le temps. L'interposition d'un matériel biologique en autogreffe représenté par le cartilage costal et son association à une trapézectomie partielle restaure la stabilité du pouce et sa force.

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**Mots clés :** Rhizarthrose ; Trapézectomie partielle ; Autogreffe de cartilage costal

## 1. Introduction

Trapeziometacarpal arthritis is very common, especially in the female population [1]. The pathogeny of this affection is still unknown but when severe arthritis is diagnosed, surgical management can be justified to limit pain and functional

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disability. Due to the anatomical and the biomechanical complexity of the trapeziometacarpal joint added to important deformities of the first ray, no ideal surgical technique is actually available.

Removal of the trapezium whether coupled or not to a ligamentous procedure seems successful in relieving pain and in restoring relative mobility but does not avoid collapse of the first ray. Since 1992, we have been applying an original technique that avoids this major pitfall. Our technique consists of a partial trapeziectomy followed by interposition of an autogenous chondrocostal graft.

## 2. Methods

### 2.1. Surgical technique

Surgery is mainly performed under regional anaesthesia but a brief general anaesthesia is performed during harvesting of the chondrocostal graft. Surgical management can be divided into three distinct steps and the team needs to prepare two adjacent surgical sites.

#### 2.1.1. First step: partial trapeziectomy

The dorsal approach is performed with a four cm-long incision between the abductor pollicis longus and extensor pollicis longus tendons. The dorsal ramifications of the sensory branch of the radial nerve and the radial artery are localized. The articular capsule is incised parallel to the articular space at the level of the trapeziometacarpal joint. This incision is continued laterally on the trapezium in order to raise a 'U' shaped capsular flap with a proximal hinge. The capsular flap is dissected in order to expose the distal half of the trapezium and the corresponding articular spaces. Osteotomy of the trapezium is performed at the midline using an oscillating saw. This osteotomy is completed cautiously using a Gouge forceps to avoid any damage to the flexor carpi radialis (FCR) tendon. The distal half of the trapezium is then excised (Fig. 1).

#### 2.1.2. Second step: harvesting of the costal graft

A horizontal approach two cm above the costal edge exposes the anterior end of the 9th rib. The osteocartilaginous junction is easily recognised owing to the difference in colour. The pleural

side of the 9th rib is then carefully scraped to separate it from the parietal pleura. A fragment of cartilage is then harvested using a blade while a flexible device protects the pleural side of the rib. Usually the cartilage is thick enough to allow harvesting without interrupting costal continuity (Fig. 2). The absence of pneumothorax is verified by positive pressure insufflations performed by the anaesthetist. The incision is then closed layer by layer with a continuous intradermal suture for skin closure, with no drainage. The incision zone is then infiltrated using 10 mL of a local anaesthetic (Ropivacaine).

#### 2.1.3. Third step: interposition of the graft

The graft is shaped by a scalpel to fit the space left by the partial trapeziectomy. This graft is then placed in the cavity with its convex superficial face against the remaining trapezium with no ligamentous procedure or temporary pinning (Fig. 3). The capsular flap is re-attached using resorbable monofilament thread. A continuous intradermal suture is used to close the skin. The wrist is immobilized in a cast leaving the interphalangeal joint free for 3 weeks.

### 2.2. Series of patients

A retrospective study of 98 patients (116 thumbs) was done between 1992 and 2005. They were operated on for primary arthritis of the trapeziometacarpal joint and reviewed by an independent surgeon in 2006. Sixteen patients were excluded from the final study; ten had either changed address or deceased, one had developed severe reflex sympathetic dystrophy with major sequelae hindering clinical evaluation and five underwent removal of their graft for persistent residual pain thus becoming in a state with total trapeziectomy.

Finally, 82 patients (69 females, 13 males) i.e. 100 thumbs were reviewed. Mean follow-up was 68 months (4–159) with a median of 61 months. Mean age at time of review was 64 years (47–82). The dominant hand was operated in 40% of cases. All the patients in this series received medical treatment prior to surgery. In all, 21% had a professional activity at time of surgery.

From a radiological point of view, 79% of the patients in this population were class 3 or 4 according to Dell's classification [2]. In all, 64% were of class 3 or 4 using Eaton's classification

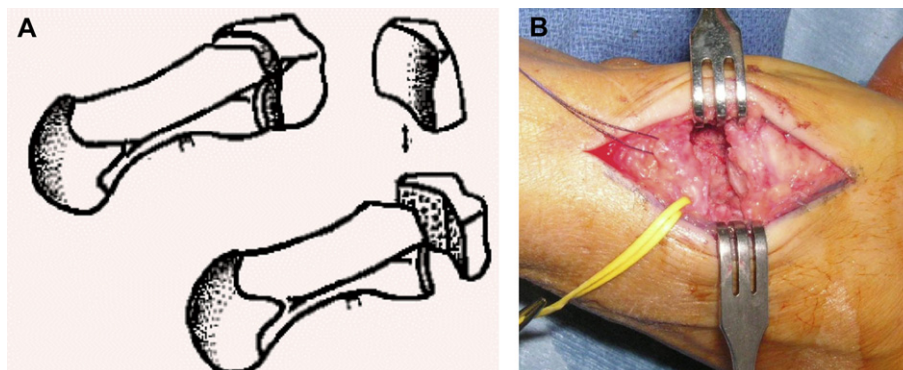


Fig. 1. A. Diagram of the distal partial trapeziectomy, which is curvilinear, but also in an oblique plane oriented toward the ventral and proximal portion of the trapezium. B. Intraoperative view of the partial trapeziectomy allowing the future insertion of the cartilaginous graft.

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